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ABSTRACT

This curriculum guide is designed to provide students with opportunities to explore different careers related to agriculture, to develop basic skills and knowledge related to the agriculture industry, and to make an intelligent selection of the speciality fields in agriculture that they will pursue in the eleventh and twelvth grades. An introductory section discusses program consideration such as time requirements, content areas, facilities, and the teaching calendar. The remainder of the curriculum presents a course of study that includes the following sixteen units of instruction: Course Orientation, Youth Leadership Training, Overview of the Agriculture Industry, Supervised Work Experience Programs, Shop and Laboratory Procedures, Agricultural Welding, Agricultural Power and Machinery, Agricultural Structures, Soil Science, Agricultural Business Management, Environmental Protection and Safety, Renewable Natural Resources, Animal Science, Plant Science, Agricultural Economics, and Energy Conservation. Each unit outline follows a typical format that includes the following information: number of class sessions, objectives, content outline, instructional suggestions, student activities, and evaluative suggestions. (LRA)

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APPLIED AGRICULTURAL SCIENCE AND MECHANICS

1 AND 2

A CURRICULUM GUIDE FOR AGRICULTURE

GRADES 9 AND 10

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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Bureau of Occupational Education Curriculum Development
Albany, New York 12234
1980

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Teachers Cooperating in the Review of Units
of
Applied Agricultural Science and Mechanics 1 and 2

Name	School	Location
Gerald Barton	Randolph HS	Randolph
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Melvin Bliss	Troupsburg CS	Troupsburg
Thomas Braymer	Oxford Academy	Oxford
Donald Brotzman	Jasper CS	Jasper
John Buckley	Warwick Valley HS	Warwick
Homer Bushey	Northern Adirondack CS	Ellenburg Depot
Patricia Carroll	Allegany HS	Allegany
Charles Couture	Griffith Institute HS	Springville
Michael Crandall	Medina HS	Medina
George Domingos	Madrid Waddington HS	Madrid
Bruce Erath	Sherburne-Earlville HS	Sherburne
Paul Gabriel	Alfred-Almond HS	Almond
Donald Hanby	Cassadaga Valley HS	Sinclairville
Roger Harrison	Barker CS	Barker
George Keller	Canajoharie HS	Canajoharie
Peter Keys	Cherry Valley CS	Cherry Valley
Harvey Lyndaker	Medina HS	Medina
Floyd Macomber	Alexander CS	Alexander
James McClay	Greenwich HS	Greenwich
Roy Matteson	Indian River CS	Philadelphia
Kerry Odell	Rushford CS	Rushford
James Rockhill	North Syracuse HS	North Syracuse
Renwick Russell	O'Neill HS	Walton
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Frank Van Apeldoorn	Albion HS	Albion
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FOREWORD

The vocational agriculture curriculum has undergone extensive revision in recent years in an attempt to meet the needs of an ever-expanding and diversifying agriculture industry. The purpose of this curriculum guide for Applied Agricultural Science and Mechanics 1 and 2 is to assist those involved in the curriculum planning and development process to expand the 9th and 10th grade offerings to include activities in the broad fields of agriculture/agribusiness and natural resources.

The initial outline of the content for Applied Agricultural Science and Mechanics 1 and 2 was developed by the staff of the Bureau of Agricultural Education under the leadership of Lee Traver, Chief of the Bureau. In August of 1976, a committee of five teachers of agriculture reviewed the outline and developed the content and an instructional format along with references, facilities, and equipment needs for each area of instruction. The committee included the following teachers:

David Brown, North Rose-Wolcott Central School, Wolcott
John Buckley, Warwick Valley Central School, Warwick
Daryl Foster, Chemung-Schuyler-Tioga BOCES, Elmira
Charles Krause, Letchworth Central School District, Gainsville
John Price, Wayland Central School, Wayland

In December of 1976, the committee met again and developed objectives, instructional suggestions, student activities, and evaluative suggestions for each area of instruction. These materials were reviewed by members of the Teacher Education Staff, Agriculture and Occupational Education, Department of Education, New York State College of Agriculture and Life Sciences, Cornell University, Ithaca.

In January 1979, selected units of Applied Agricultural Science and Mechanics 1 and 2 were sent to a cross section of the State's teachers of Agriculture for their review and suggestions. Comments were received relative to all units except number 11, Environmental Protection and Safety. All of the remarks and suggestions received from the teachers were considered carefully by the staff of the Bureau of Agricultural Education as they made their final review of the Curriculum Guide in preparation for printing. The teachers that cooperated in this review are listed on the preceding page.

Assistance relating to content was provided by Harry Karpiak, former associate in the Bureau of Agricultural Education. The project was coordinated and the manuscript prepared for publication by Nelson S. Maurer, associate in the Bureau of Occupational Education Curriculum Development.

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PROGRAM CONSIDERATIONS

Today, agriculture is more than just farming. Over the years this industry has diversified and now includes production agriculture as well as agribusiness and the professions related to agriculture. Just as agriculture has changed, so have the educational programs in agriculture. Present programs provide students with opportunities to study speciality fields in agriculture and gain insights into the wide range of careers that are available in agriculture and related fields.

Purposes

Traditional courses in Agriculture 1 and 2 were oriented towards production agriculture. The implementation of instruction in seven speciality fields at the 11th and 12th grades has increased the students' need for a broad and comprehensive course at the 9th and 10th grades. The purposes of the program in Applied Agricultural Science and Mechanics 1 and 2 are to provide students with opportunities to explore different careers related to agriculture, to develop basic skills and knowledge related to the agriculture industry, and to make an intelligent selection of the speciality fields in agriculture which they will pursue at the 11th and 12th grades.

Time Requirements

To implement the suggested content for Applied Agricultural Science and Mechanics 1 and 2 requires a single period of instruction for 2 years. One unit of credit is granted each year for a total of 2 credits. These credits may be part of group II, major sequence, when followed by an offering in one of the occupational fields of agricultural education.

Content Areas

The curriculum for Applied Agricultural Science and Mechanics 1 and 2 includes 16 areas of instruction. Time distributions for the different areas of instruction are suggested. Only 168 periods are planned each year in order to allow the local school the opportunity to include all the areas and also provide a block of time for local needs.

Areas of Instruction	Suggested Time Distribution Number of Periods	
	Course 1	Course 2
Course Orientation	3	3
Youth Leadership Training	15	10
Overview of the Agriculture Industry	5	1
Supervised Work Experience Programs	10	8
Shop and Laboratory Procedures	3	3
Agricultural Welding	15	10
Agricultural Power and Machinery	25	10
Agricultural Structures	10	25
Soil Science	10	15
Agricultural Business Management	5	10
Environmental Protection and Safety	7	15
Renewable Natural Resources	12	10
Animal Science	20	20
Plant Science	20	20
Agricultural Economics	5	5
Energy Conservation	3	3
Local Option	12	12
	180	180

Local adaptations to this course may be made. However, instruction needs to be provided in *all* 16 areas. The specific local emphasis should be determined by the teacher of agriculture with help from the school's administrator and an advisory committee composed of local people involved in production agriculture and agribusiness.

Supervised Work Experience

Supervised work experience is an essential part of every student's agricultural preparation and requires the involvement of numerous individuals in both the school and community.

School authorities establish the policy for the program's operation and grant permission for individual participation. Prospective employers are contacted to enlist their cooperation and support. The local agriculture advisory committee provides input and makes recommendations relative to the operation of the program. Cooperation and permission to participate in the program are obtained from the parents of students involved.

The teacher of agriculture explains to the students the purposes and operation of the program as well as the many opportunities that are available. The guidance personnel are involved because they are responsible for coordinating the school's educational and occupational programs. Good rapport and open channels of communication are necessary among employers, teachers, guidance personnel, and students for the successful operation of a supervised work experience program.

Youth Leadership Training -- FFA

Youth Leadership training is accomplished by having students take part in the activities of the local chapter of the FFA. The FFA is a national organization of students enrolled in instructional programs in vocational agriculture. A major emphasis of the FFA is the development of the skills and abilities necessary to prepare young people for leadership roles in the field of agriculture and agribusiness. By participation in such activities as self-improvement, leadership, contests, and travel, students are able to broaden their concepts of the career opportunities that exist in agriculture and related areas. A local FFA chapter adds interest and gives meaning to the classroom instruction and thus is an important and integral part of each program of vocational agriculture.

Recommended Facilities

The facilities needed to conduct the courses in Applied Agriculture Science and Mechanics 1 and 2 are those used for the total 8th-12th grade vocational agriculture program at the local school. A brief description of these facilities is given below. For further recommendations on facilities, contact the Bureau of Agricultural Education, State Education Department, Albany, NY 12230.

Classroom

A classroom for 20 students requires at least 750 square feet. This space includes storage cupboards and display areas for instructional materials. If the anticipated enrollment exceeds this number, an additional 25 square feet should be allowed for each pupil above 20 based on the largest class to be scheduled. This classroom should be adjacent to the shop with at least a 6 foot by 4 foot glass wall between the classroom and shop to enable the instructor to view students from one area to the other. Five or six conference tables are needed to accommodate the students in a variety of classroom activities. A desk or an instructional table should be provided for the instructor.

Shop

An agricultural shop needs at least 2250 square feet of floor space for a class of 20. If the anticipated enrollment exceeds this number, a teacher assistant needs to be employed and an additional 125 square feet of space provided for each student in excess of 20. Part of the floor space may be partitioned to form a storage area. Extra storage facilities should be provided when the facilities are used for adult education classes. The shop should be on the ground level, adjacent to the classroom, and provided with an outside entrance having a minimum opening of 14 feet in width and 12 feet in height.

Greenhouse

A greenhouse with at least 800 square feet is needed to provide students with experiences in the plant science area of the curriculum. The greenhouse should have a southern exposure and be supplied with water, electricity, and controllable heat and ventilation.

Course Approval

Courses in Applied Agriculture Science and Mechanics 1 and 2 that follow the suggested course of study provided with this curriculum guide are eligible for credit towards a State diploma without further approval.

Courses developed locally that follow a different organizational pattern may be submitted, with appropriate application forms, to the Bureau of Occupational Education Curriculum Development for consideration for State diploma credit. The suggested course that is provided in this publication should be used as a guide for developing the local course. Administrators, teachers of agriculture, and members of the advisory committee have the option of determining the degree of emphasis that is to be given locally to each area of instruction. However, *all 16 areas of instruction need to be included in each locally developed course of study.*

A teaching calendar and a scale drawing of the facility layout, with the equipment labeled on the drawing, should be submitted in addition to the materials requested by the instructions on the application for course approval.

Teaching Calendar

A teaching calendar is a functional planning tool for selecting and recording, in chronological order, the units of instruction that are to be taught in a logical sequence. A teaching calendar needs to be developed to show how the content is divided between course 1 and 2. Consider the amount of time needed for each unit, the most appropriate season(s) to present each unit, the facilities and equipment available, and the number of students who have need for each specific unit. The teaching calendar is then used to develop daily lesson plans. A sample teaching calendar for Course 1 is given on page 5. The format of the calendar is one of several that could be used.

Teaching Suggestions

The following points are offered as suggestions for improving instruction:

- Review each area of instruction well in advance of the time it is presented and arrange for the needed instructional materials, teaching supplies, resource people, demonstrations, field trips, and student involvement in supervised work experiences.
- Provide activities that will give students opportunities to explore and develop skills in all of the specialty fields of agriculture.
- Use a number of teaching techniques and methods which will provide a variety of learning experiences in order to challenge the students of different ability levels.

A SAMPLE TEACHING CALENDAR

Course 1

Month	Days	Unit/Area of Instruction	Periods Allocated
Sept.	18	Course Orientation	3
		Overview of Agricultural Industry	5
		Youth Leadership Training	5
		Supervised Work Experience Programs	5
Oct.	20	Laboratory Procedures	3
		Soil Science	7
		Animal Science	10
Nov.	20	Agricultural Structures	10
		Renewable Natural Resources	6
		Agricultural Welding	4
Dec.	14	Agricultural Welding	11
		Energy Conservation	3
Jan.	20	Agricultural Power & Machinery	10
		Agricultural Business Management	5
		Supervised Work Experience	5
Feb.	15	Animal Science	10
		Agricultural Economics	5
March	18	Plant Science	8
		Youth Leadership Training	10
April	22	Agricultural Power & Machinery	15
		Plant Science	7
May	21	Soil Science	3
		Renewable Natural Resources	6
		Plant Science	5
		Independent Projects	6
June	13	Independent Projects	6
		Environmental Protection & Safety	7

- Arrange for meetings of students, teachers, and guidance counselors during the year so that, upon completion of Applied Agricultural Science and Mechanics 1 and 2, students will be able to make meaningful decisions regarding the type of occupational program and career area they will pursue.

- Give several examples of career opportunities in each of the speciality fields and related areas of agriculture.

- Use, when applicable, any of the modules that were developed for the agricultural courses in grades 11 and 12.

SUGGESTED COURSE OF STUDY

The content of the following course in Applied Agricultural Science and Mechanics 1 and 2 was carefully selected by a committee of agriculture teachers working under the guidance of the State Education Department. The suggestions they provided are to be considered not as the only way or the final answer, but as a point of departure for developing more imaginative presentations.

Outcomes

Upon completion of the suggested program of instruction students will:

- Have developed some basic skills, competencies, and knowledge in agriculture

- Be able to select a speciality field in agriculture which they can pursue as part of their vocational preparation

- Be able to explain several career opportunities related to each of the speciality fields of agriculture

Format

The format used for the course of study is designed to assist in the planning and instructional process. A brief explanation of each part is given below.

- Class Sessions list the number of periods of instruction that are suggested for each course and are to be used as guides when developing local courses of study.

- Objectives are stated in terms of what the students will be able to do when they apply the skills and knowledge acquired at the completion of that area of instruction. The objectives are numbered and refer to specific items in the content outline.

- Content Outline contains the necessary information, in topical form, to implement the stated objective. This content exposes the students to the many careers that exist in agriculture as well as providing opportunities to develop the basic skills and knowledge needed in agriculture. The number following each topic relates to a specific objective.

- Instructional Suggestions give teaching methods which will assist in presenting the specific content.

- Student Activities suggest specific experiences that will help the learner develop the required skills and knowledges.

- Evaluative Suggestions include specific activities that will aid the instructor and the student to identify the degree to which the student has achieved the stated objectives. They also provide the instructor with alternative modes useful in assessing the student's competency.

- Resources list the various items needed to implement the suggested instructional program. In addition to the classroom, shop, greenhouse, and land laboratory, these resources include audiovisual aids, periodicals, bulletins, books, magazines, charts, models, equipment including homemade items, machinery, tools, and teaching supplies. The teacher should identify specific community resources, governmental agencies, and private or industry personnel in agribusiness and production agriculture that may be used for field trips, students' supervised work experience programs, and general program enrichment. Suggested resources will be provided by the State Education Department at a later time.

SUGGESTED COURSE OF STUDY

COURSE ORIENTATION

Unit 1

Class Sessions - Course 1 — 3 Course 2 — 3

Objectives

After completing this area of instruction, students will be able to:

(1) Explain the components of an agricultural education program.

(2) Describe the subject matter that will be taught and the experiences encountered in the various courses in vocational agriculture.

(3) List the requirements for the successful completion of the various courses in vocational agriculture.

(4) Explain the methods used to evaluate student performance.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Components of an Agricultural Education Program (1) • Classroom instruction	Discuss with the class the components of an agricultural education program, and show how classroom instruction, FFA activities, and supervised work experience all contribute to the total instructional program.		List the components of an agricultural education program.
	Illustrate with examples how community resources are used to supplement the classroom instruction.		Explain why community resources are used to supplement classroom instruction.
	Invite junior or senior agriculture students and/or former graduates to discuss the benefits they received from studying agriculture in high school.	Summarize the key points made by guest speakers, and file in notebook.	Explain the advantages of studying vocational agriculture in high school.

• Supervised work experience program	Discuss the advantages of participating in a supervised work experience program. Develop with students a list of places in the community that could be used for conducting work experience programs.	From the list of work experience locations identified in class, select a place that would be acceptable for conducting a supervised work experience program. Discuss the purpose of work experience programs with your parents. Notify the teacher of your intentions so that arrangements may be made with an employer for program implementation.	Give four reasons for participating in a work experience program.
• Youth leadership training	Discuss how FFA activities are used to develop individual leadership qualities.	Join the local FFA chapter and participate in the various club activities.	
Course Content (2)	Distribute a sheet that explains the course content of Applied Agricultural Science and Mechanics 1 and 2. Include time periods allotted to each of the 16 major areas.	File handout and notes in notebook that will be used exclusively for Applied Agricultural Science and Mechanics 1 and 2.	Indicate how the course content for Applied Agriculture Science and Mechanics 1 and 2 will meet individual career needs.
Course Requirements (3)	Develop with the students the requirements needed to successfully complete Applied Agricultural Science and Mechanics 1 and 2. Include such items as: • Attendance • Work assignments • Notebook • Attitudes and work habits • Conduct in class and on field trips (discipline) • Tests and quizzes • Work experience program • Safety rules and safe work habits • Use of school supplies and equipment	Set up and maintain a notebook for Applied Agricultural Science and Mechanics to keep tests, quizzes, and all materials distributed by instructor.	Explain the requirements that need to be met in order to successfully complete Agricultural Science and Mechanics 1 and 2.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES
Course Requirements (cont'd)	Discuss the policies and the code of conduct that is outlined in the school's *Student Handbook.* Develop with students a list of the responsibilities that they have relative to meeting the course requirements. Include such items as: • Following all safety rules • Working to their individual ability levels • Coming to school when possible • Participating in class discussion and activities • Being courteous and cooperative	Become familiar with and abide by the contents of school's *Student Handbook.*
Evaluation (4)	Explain the standards that will be used to evaluate student progress and the importance of each item in determining grades.	

YOUTH LEADERSHIP TRAINING

Unit 2

Class Sessions - Course 1 — 15 Course 2 — 10

Objectives

After completing this area of instruction, students will be able to:

(1) Explain briefly the history of the FFA, and state the major aims and purposes of the organization.

(2) Assist in developing a program of work for the local FFA chapter.

(3) Participate in FFA program activities.

(4) Fill out FFA award applications that apply to their situation.

(5) Participate in local FFA chapter meetings.

(6) Communicate effectively.

(7) Write and deliver speeches.

(8) Implement the principles of public relations through their behavior in school-community activities.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
History, Aims, and Purposes of the FFA (1)	Invite a State or national officer to discuss with the students the history, aims, and purposes of the FFA. See "Modules of Instruction in Leadership Development."	Record key points made by speaker, and file in notebook.	Explain how any six of the aims and purposes of the FFA may affect his/her life during the next year.
	Distribute the *Official FFA Manual* and *Student Handbook — FFA* to each student. During a period of supervised study, have students read specific parts in the *Manual* and *Handbook* on the history, aims, and purposes of the FFA. Obtain the *Official Manuals* and *Handbooks* from the National FFA Supply Service.	Read the assigned parts in the FFA *Manual* and *Handbook*, and be prepared to write a short report on the history, aims, and purposes of the FFA.	Write a short report on the history, aims, and purposes of the FFA.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
History, Aims, and Purposes of the FFA (1) (cont'd)	Ask local FFA officers to share with the students the benefits they have received from being members of the FFA.	Be prepared to question the officers on benefits they have received from FFA membership.	List 10 benefits of being a member of the local FFA chapter.
	Make available local FFA scrapbooks or school yearbooks that give reports about former members and chapter activities. Divide class into small groups according to the books available. Ask each group to make a list of former FFA members who still live in the area.	Interview three former FFA members to find out how their experiences in chapter activities influenced their careers.	Report on the comments that former members made about the influence that FFA activities had on their careers.
	Invite past FFA members living in the community to discuss with the students the benefits they received from being members of the FFA. A panel may be used for this activity.	Record key points made by speakers, and file in notebook.	List 10 benefits of FFA membership mentioned by the speakers.
	Discuss with students the advantages of having an alumni association. Secure FFA alumni association chapter information, including slides and tapes, from the National FFA Supply Service.	Have students contact former members and investigate their interest in forming an FFA alumni club. Plan and provide leadership for an initial meeting to discuss the organization of an FFA alumni association.	List five advantages of having an FFA alumni association.
Develop and Maintain an FFA Chapter • Program of work (2)	Explain the purpose and need to develop a program of work for the local FFA chapter.		Give three reasons why a program of work is needed for the local FFA chapter.
	Distribute to each student copies of past programs of work of the local chapter. Discuss with the students the contents of one of these programs of work.	Examine and discuss the effectiveness of the program of work provided.	

Develop and Maintain an FFA Chapter • Program of work (2) (cont'd)	Describe how to develop a new program of work for the local FFA chapter that meets the needs and interest of the students. See copies of *New York FFA Chapter Handbook, FFA Advisor's Handbook*, and the *Student Handbook.*		List the procedure to follow when developing a program of work for a local FFA chapter.
	Ask FFA chapter officers to discuss with the students the importance of developing a program of work for the chapter.		
	Distribute the pages with the headings for the 11 divisions of an FFA program of work. Plan with the students a program of work for the coming year. Include such activities as the Building Our American Communities (BOAC) and Food for America programs. Obtain copies of *FFA Activity Handbook* and *FFA Guide to Activities*, from the State FFA office.	Assist in developing the current program of work and record activities on the pages provided. Arrange for the typing and collation to be done either by a typing class or individual FFA members.	
	Provide class time to select the activities desired for the local FFA chapter. Divide class into major committees, appoint chairpersons, and develop plans for implementing activities.	Submit the local program of work for the Chapter Recognition Competition. Programs of work are to be sent each year to the State Education Department by November 15.	
Activities (3)	Explain the need and importance of the members participating in the various chapter activities listed in the program of work. Have local officers talk about the past activities in which individuals have participated. Show awards received and briefly state how they were earned.	Select areas of the program of work that are appropriate and volunteer for committee work. Participate in the various activities of the local FFA chapter.	List five advantages of participating in various FFA activities.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
FFA Degrees, Awards, and Contests (4) • Local • Subdistrict • District • State	Explain the requirements and the preparation needed for the various degrees, awards, and contests available in the FFA. Emphasize those activities that relate to first and second year students. See the *New York FFA Chapter Handbook*, *Student Handbook*, and "Modules of Instruction in Leadership Development." Use also the chart, "FFA Foundation Awards," that is available from the National FFA office.	Apply for appropriate degrees. Complete application for appropriate awards. List the contests that are available and, enter in notebook. Review with the instructor those contests that are of a particular interest.	Explain the requirements for each of the four degrees of membership in the FFA. Submit applications for subdistrict, district, and State awards. Applications will be reviewed and rated as to quality before being sent to subdistrict and district level completion. Participate in various types of contests at the local, subdistrict, and district levels.
	Discuss with students the records needed to participate in the awards program. Show students, using records of previous winners, how to set up and maintain the necessary records.		
	Invite a student who has earned an individual accomplishment or proficiency award to explain the records that he/she kept, and discuss the visit that was made to evaluate the application.	Prepare questions to ask student speakers about their participation in awards, the type of records required, and the quality of performance necessary to receive an award.	Keep records on supervised work experience projects, and make available to instructor for review and evaluation.
	Arrange for students to practice for the various contests by having competitions within the class. Have the winners in each class compete against the winners from other classes.	Practice for various local, subdistrict, and district contests.	Participate in FFA contests at the local, subdistrict, and district levels.
	Recognize students that qualify for FFA Achievement Awards. Certificates are available from the National FFA Supply Service.		

FFA Meetings (5) • Parliamentary procedures	Explain the need for and the importance of using parliamentary procedures when conducting a meeting. Illustrate the need for orderly procedures when conducting classroom activities. See "Modules of Instruction in Leadership Development."	Read section on parliamentary procedures in *Student Handbook*.	Write a short report on the importance of using parliamentary procedure during a chapter meeting. For three teacher-prepared situations, list the parliamentary procedures necessary to handle each situation.
	Distribute to each member a copy of the "Guide to Using Parliamentary Procedure" available from Instructional Materials Service, Cornell University, Ithaca, NY.	Complete the worksheet on parliamentary procedures. Prepare a motion to purchase an item or to involve the chapter in a specific activity.	
	Develop a student worksheet to be used with "Guide to Using Parliamentary Procedure."		
• Order of business • Agenda	Discuss the importance of having an order of business and an agenda when conducting a meeting.		List the order of business and develop an agenda for a specific meeting.
	Use as examples copies of agendas from past meetings of the FFA or other groups to which the students belong.		
	Hold a mock meeting. Divide the class into groups of three or four students. Assign each group different items of business and have them develop an agenda for the meeting. Ask each student to perform a specific function or fill an office.	Work in groups to develop an agenda for the mock meeting. Participate in the mock meeting. Participate in local FFA chapter meetings following recommended parliamentary procedures.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
FFA Meetings (5) (cont'd)	Arrange for the class, or have individuals on their own, attend a meeting of some adult group that uses parliamentary procedures in its meeting. These groups could include fire departments, local service organizations, and government committees. This would allow students to see how parliamentary procedures are used or misused in many places and also expose them to other community groups and organizations.	List the names and positions of individuals met and record the order of business and procedures used at the meetings. Compare the order of business and agenda for an FFA meeting with the procedures used by a local organization.	Give an oral report on the highlights of the meeting and the purposes of the group visited.
• Responsibilities of officers	Invite a subdistrict, district, or State officer to speak on the responsibility of being an officer. See "Modules of Instruction in Leadership Development."	Prepare questions to ask the speaker about his/her responsibilities.	List the responsibilities of at least three offices in the FFA.
	Show a film, "Sights and Sounds of the National FFA," that is available from the National FFA Supply Service. Point out parliamentary procedures in action and the functions of the different National officers.	Record the key points of the film, and file in notebook.	List the responsibilities of three national offices as presented in the film.
Public Speaking (6,7) • Importance	Explain the importance of being able to speak at a public gathering.		List five reasons for being able to speak in public.
	Introduce the topic of public speaking by having students listen to the winning speeches made at the National FFA Public Speaking contest.		
	Invite a former participant in the FFA Public Speaking contest to give his/her speech in class.		

Public Speaking (6,7) (cont'd)	Explain the procedure to follow when writing a speech. Discuss selecting a topic, and the method of outlining a speech.		
	Outline a speech on the chalkboard using a common topic.	Select a topic for a speech.	Develop an outline for a speech.
• Writing speeches	Invite an English teacher to discuss the procedures to follow when researching and writing a speech.	Record the key points made by the English teacher, and file in notebook.	
		Research a selected topic.	Write a 2- to 3-minute speech using the outline developed.
• Delivering speeches	Explain the techniques of delivering a speech.	Rewrite speech to incorporate delivery techniques discussed in class.	List five delivery techniques used by good public speakers.
	Invite the communications teacher or another person involved in the area of speech to discuss the techniques of presenting a speech.	Summarize main points made by speaker, and file in notebook.	
	Have each student present a 2-to 3-minute speech in class. Judge the speech according to an official FFA scorecard. Judges may be other students, administrators, teachers, or community people.	Refine speech. Be prepared to give it before the class and answer questions related to the topic.	Present a 2- to 3-minute speech before the class and answer questions for a reasonable length of time.
	Arrange for the use of a large school room or auditorium for the final run-off of the speeches. Have an elimination contest between classes to determine the subdistrict competitor. Arrange for students to invite guests. Judges may be same as above.	Obtain permission for the use of a large room or auditorium. Invite school administrators, teachers, and students to the final contest.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Public Relations • Local school (8)	Explain the importance of the school having good relations with the local community. Discuss ways of improving this relationship.	List five things that can be done to improve the relationship between the school and community.	Explain the advantages of the school having good relations with the community.
	Point out the importance of the FFA having good relations with the school and community. Emphasize the part the individual member has in developing and maintaining this relationship.	Write news releases about local FFA activities and submit to school and local papers.	Explain the part the individual FFA member has in developing good relations with the school and community.
	Discuss various FFA programs that may help develop good school and community relationships such as Building Our American Communities (BOAC), Food for America, and the National Safety Award Programs.	Review various FFA activities available to the local chapter. List those activities that have a high potential for developing good relationships with the school and community.	List five FFA activities that may be used to develop good school and community relationships.
	Show the slide and tape presentation, "Food for America Program," to illustrate how to conduct a Food for America program. Materials available from the National FFA Supply Service or Instructional Materials Service at Cornell University.	Record the main points presented in the slides, and file in notebook.	
	Elect a chairperson to conduct the Food for America program, and have this person secure the Food for America Program packet from the National FFA Supply Service. Assign specific tasks to members.	Take slides of local Food for America activities, and present at annual parent and student banquet.	Participate in the Food for America Program in a cooperating grade school.

Public Relations (cont'd)	Show slide set, "Planning a Successful Chapter Banquet," to illustrate the steps involved in planning a banquet. Materials available from the National FFA Supply Service.	Suggest ideas for an FFA banquet program and activities.	Help develop a program for an FFA banquet.
	Assist students to plan a banquet program. Elect a banquet chairperson and an assistant, and assign specific tasks to other students such as, location of the banquet, menu, guests to be invited, awards to be presented, entertainment, financing, officer responsibility, and developing and printing programs.	Work in small groups to plan and complete the assigned tasks for the banquet.	Participate in an FFA parent-student awards banquet.
• Community	Discuss the advantages of the FFA Chapter participating in a BOAC program. Secure film, filmstrip, or transparencies on BOAC programs that have won awards in past years to illustrate the type of activities that are possible. Materials available through the National FFA Supply Service.	Record the key points about the BOAC program stated in the film or filmstrip, and file in notebook.	List at least five advantages of participating in the BOAC program.
	Discuss with students the school and community leaders whose cooperation is essential when conducting a BOAC program. Include such leaders as the Mayor, Fire Chief, Town Councilmen, Superintendent of Schools, Principals, 4H Leaders, Scout Leaders, and members of the Chamber of Commerce and service organizations.	Contact various school and community officials, and ask for their cooperation when conducting a BOAC program. Keep them informed of progress, when appropriate. Meet with Town, Village, and School leaders to formulate plans. Report findings to class.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Public Relations (cont'd)	Write/or invite a representative from the Federal Housing Administration to discuss their involvement with the BOAC program and how the FHA can assist the program.	Be prepared to ask questions of speaker. Inform the guest of the group's intentions regarding the BOAC program.	
	Plan the BOAC program for the year and outline the procedures that will be followed. Assign specific tasks to various class members.	Participate in selected activities of the BOAC program.	Submit BOAC award application for district and State competition.

OVERVIEW OF THE AGRICULTURE INDUSTRY

Unit 3

Class Sessions - Course 1 — 5 Course 2 — 1

Objectives

After completing this area of instruction, students will be able to:

(1) Describe the importance of agriculture and agribusiness at the local, county, State, and national levels.

(2) List the types of agriculture in the local area and in the State.

(3) Describe the changes and trends in the agriculture of the State.

(4) List general career opportunities in agriculture and agribusiness that exist in the local area and in the State.

(5) Define agriculture in broad terms which include the ancillary areas as well as the fields of farm production.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
The Importance of Agriculture and Agribusiness (1) • Local • County • State • National	Ask students to write their definition of agriculture. At the completion of the Unit, ask them to write again their definition of agriculture and compare with their first one.	State your definition of agriculture, and file in notebook. Compare this definition with the one that you give at the conclusion of the Unit.	
	Introduce the unit with a filmstrip on the future of agriculture.		
	Using economic and statistical information, discuss the impact that agriculture and agribusiness has on the local, county, State, and national economies.	List six agricultural specialty fields and rank each according to its economic importance in the local area and in the State.	Explain the effect that each of the agricultural specialty fields has on the local and State economies.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Importance of Agriculture (cont'd)	Illustrate, using links of a chain, how agribusiness complements production agriculture. Use examples such as sales and services, processing, and marketing and distribution to show the role and dollars generated by agribusinesses. Show how agribusinesses affect the local, county, State, and national economies. See "Modules of Instruction for Agricultural Supplies and Services." Explain how the multiplier factor of 3 is used to estimate the dollars produced by agribusinesses.	List the agribusinesses in the local area. List the services supplied to agriculture by agribusinesses. Summarize the main parts of the class discussion and file in notebook.	Explain the importance of four services provided by agribusinesses.
Types of Agriculture (2)	Using county and State agriculture census information, develop with students a list of the agriculture enterprises associated with each of the following: livestock, field and forage crops, fruits, vegetables, horticulture, forest products, and laboratory animals and pets.	Summarize the main points of the class discussion, and file in notebook.	
	Use typographical maps and climatic information to show why different enterprises have a tendency to be located in specific areas of the State.		List the major agriculture enterprises in the State and explain why different enterprises are located in specific areas.
	Obtain information from the: New York State Dept. of Agriculture and Markets, • Bureau of Statistics and • Crop Reporting Service State Campus Albany, New York		

Types of Agriculture (cont'd)	New York State College of Agriculture and Life Sciences, • Department of Agricultural Economics Ithaca, New York Syracuse University • Department of Forestry Syracuse, New York		
	Provide students with an outline map of New York State.	Draw on a map of New York State the major agriculture regions, and file in notebook.	
	Develop worksheets to use with the statistical economic data that show the dollar values of various agriculture enterprises in the county and in the State.	Make a chart that illustrates the economic importance of all agriculture enterprises in the county and in the State. File in notebook.	List the major agriculture enterprises in the area and in the State, and explain how this information can be used to select components for a successful farm business.
	Develop with students a list of the agricultural enterprises and agribusinesses in the area. Include types and numbers employed in each.		Explain why specific kinds of agriculture enterprises and agribusinesses exist in the local area.
Changes and trends in New York State Agriculture (3)	Develop a worksheet based on county and State census data that shows the changes and trends in the number, types, and sizes of farms in the county and in the State.	Complete the worksheet showing the changes and trends in agriculture enterprises at the county and State levels. File in notebook.	Discuss the trends that appear to be developing in the number, sizes, and types of farms in the local area and the State.
	Obtain information from "New York Economic Handbook, Agriculture Situation and Outlook" and yearly issues on farm income data published by the New York State College of Agriculture and Life Sciences, Dept. of Agricultural Economics.		

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Career Opportunities (4)	Discuss with students the different levels of employment available in the field of agriculture and agribusiness. Include such types of jobs as general workers, supervisors, managers, owners and owner-operators, technicians, and professional personnel. Indicate the general qualifications needed for entrance into each type of job cited.	Develop a chart that shows the broad classification of the various jobs in agriculture and agribusiness in the area. Consider such categories as general workers, supervisors, owners, technicians, and professional personnel.	Select three possible jobs in the field of agriculture or agribusiness and briefly describe how a person would prepare himself/-herself to enter each job.
	Discuss with the students different sources for information on careers in agriculture or agribusiness.	Use the guidance office and/or library as a source for information on careers in agriculture or agribusiness.	
	Discuss with students the opportunities for advancement to higher level jobs and the qualifications needed in experience and/or training for such an advancement.	Add to the above chart the qualifications necessary for employment in each broad category.	
	Show films that depict the many career opportunities that exist in the field of agriculture and agribusiness.		

SUPERVISED WORK EXPERIENCE PROGRAMS

Unit 4

Class Sessions - Course 1 — 10 Course 2 -- 8

Objectives

After completing this area of instruction, students will be able to:

(1) Explain the purposes of supervised work experience programs.

(2) Identify places in the community or area that can be used to conduct supervised work experience programs.

(3) Contact employers, complete job applications, and have a successful job interview for a specific supervised work experience program.

(4) Develop their own work experience programs.

(5) Keep appropriate supervised work experience records.

(6) Develop acceptable attitudes and work habits while participating in supervised work experience programs.

(7) List State and federal regulations affecting their employment.

(8) Complete student work experience agreements with parents and/or employers.

(9) Complete and submit FFA award and degree applications.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Purposes of Work Experience Programs (1)	Discuss, using slides of successful programs, how supervised work experience provides opportunities to apply the knowledge obtained in the classroom.	List projects that you can realistically complete while enrolled in vocational agriculture.	Explain the advantages of participating in a supervised work experience program.
• Provide realistic situations	Explain how supervised work experience programs help students to explore career interests and become exposed to employment situations.	Select an area of specific interest for a career that could be used for a supervised work experience program.	
	Invite former students who had outstanding supervised work experience programs to discuss how their projects helped them explore their career interests.	Summarize the main points made by the speakers, and file in notebook.	List three practices suggested by the guest speakers that could be used in supervised work experience programs.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
• Part of course	Explain why supervised work experience programs are required of all students enrolled in vocational agriculture.		
	Use a transparency or chart to illustrate the interrelationships of class instruction, supervised work experience programs, and FFA activities.	Make a diagram that shows the three components of an agricultural education program.	Explain how supervised work experience programs, classroom instruction, and the FFA are interrelated.
• Obtain extra school credit	Explain how students can earn extra school credit when participating in supervised work experience programs by working in off-farm agricultural occupations such as ornamental horticulture, conservation, and agribusiness, and by working in farm-type occupations related to production agriculture.		Explain how extra school credit can be earned by participating in a supervised work experience program.
	Follow school policy relative to cooperative education programs.		
• Develop skills for employment	Discuss how supervised work experience programs provide students with opportunities to develop skills and competencies needed for employment.	List the competencies and skills required to perform a specific job in agriculture or agribusiness.	List the personal skills and competencies needed for employment that can be developed through a work experience program.
	Prepare and present a set of slides which show the skills that can be developed through supervised work experience programs.		

• Become established in business	Invite present and former students, parents, and employers to discuss how supervised work experience programs can be used to acquire the management skills needed to become established in business.	Summarize the main points made by the speakers, and file in notebook.	Explain how supervised work experience programs can help a person acquire necessary management skills.
• Obtain and manage capital	Discuss the need for and ways of obtaining capital to finance a supervised work experience project. Indicate that Youth Project Loans are available from the Farm Home Administration (FmHA).		Explain ways of obtaining capital to finance a supervised work experience project.
	Develop budgets that show the capital required to conduct various types of supervised work experience programs. Explain the importance of making wise management decisions regarding the earnings received from projects.	Develop a budget for a specific work experience project.	Explain how the profits from a supervised work experience project could be used.
Places Used for Supervised Work Experience Programs (2) • Agribusiness • Home • Public and private lands • Cooperating farms • Family farms	Prepare and show slides of present and former students involved in supervised work experience programs that illustrate the types, activities, and locations of such programs.	Summarize the key points made in the presentation, and file in notebook.	List at least eight types of projects that could be used for supervised work experience programs.
	Using community and neighborhood survey information, develop with the students a list of people in the area who are willing to participate in supervised work experience programs.	Select several locations as potential places to conduct a work experience program.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Places Used for Supervised Work Experience Programs (cont'd)	Arrange for a visit to an agribusiness that is employing a student and have the employer discuss his/her role in providing supervised work experience opportunities and give reasons why he/she is participating in the program. Also, have the student explain his/her duties and responsibilities.	Report on the highlights expressed by the employer involved in conducting a supervised work experience program. Summarize the duties and responsibilities as indicated by the student. File in notebook.	Explain the responsibilities of employers and students who are involved in supervised work experience programs.
	Arrange for class members to visit present and former students to observe and discuss supervised work experience projects and job responsibilities.	Report on the main points presented by the speakers, and file in notebook.	Select a specific project and/or employment opportunity that can be used for supervised work experience program.
Participate in a Supervised Work Experience Program (3) • Contact employers • Complete job application blank	Discuss the procedure to follow when contacting perspective employers for placement in a supervised work experience program. Include such items as completing a job application blank, proper dress and grooming, and conduct prior to and during an interview.	List the procedures to follow when acquiring a job and/or permission to conduct a supervised work experience program. Gather personal data to use when completing a job application blank. Complete a sample job application form.	Prepare and submit an application for placement in a supervised work experience program.
• Participate in a job interview	Invite a local businessperson to discuss the items he/she includes in an interview such as job responsibilities, working hours, wages, and fringe benefits. Indicate the important points that may be discussed during an interview.	Summarize key points made by the speaker, and file in notebook.	List four items that should be discussed during a job interview.
	Invite a personnel manager from a local agribusiness to role play job interview situations. Use video tape to record the interviews.	Participate in mock job interview situations.	Obtain an interview for employment at a local agribusiness for placement in a supervised work experience program.

Participate in a Supervised Work Experience Program (cont'd)	Discuss the Agricultural Employment Interview contest and show how to use the materials provided.		
Develop Supervised Work Experience Programs (4) • Ownership-type projects	Discuss various kinds of ownership-type supervised work experience projects including: nursery plants; cut flowers; field and vegetable crops; bees, game birds; poultry; tree plantations; fish, soil, and water management; swine; sheep; beef; and dairy animals.	Select a project that is realistic and can be completed as an ownership-type supervised work experience project.	Explain the types and kinds of facilities, equipment, capital, and records required to conduct a specific ownership-type of supervised work experience project.
	Develop with students the types and kinds of facilities, equipment, records, time, and capital required to conduct various kinds of ownership-type supervised work experience projects.	Participate in a selected supervised work experience project conducted during and out of school.	Students will be evaluated on the way they conduct their ownership-type of supervised work experience projects.
• Nonownership-type projects	Discuss various kinds of nonownership-type of supervised work experience projects such as those conducted at florists, nurseries, tree farms, truck farms, and recreational facilities.	Select a place that would be satisfactory to conduct a nonownership-type of supervised work experience project.	Explain how to make arrangements with an individual to obtain permission to conduct a nonownership-type of supervised work experience project.
	Using school and community resources and equipment, help students develop work experience projects related to animal, crop, natural resources and conservation, ornamental horticulture, or agribusiness.		Students will be evaluated on the way they conduct their nonownership-type of supervised work experience projects.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Develop Supervised Work Experience Programs (cont'd)	Explain sources of financing and procedures to follow when making arrangements with owners of facilities for permission to use their resources to implement supervised work experience projects.	List possible sources for financing a nonownership-type of supervised work experience project.	Obtain the necessary capital to finance a nonownership-type of a supervised work experience project.
Work Experience Records (5)	Discuss the importance of keeping complete supervised work experience records. Explain how to keep, analyze, and use the following types of records: personal budget, leadership achievement, record of participation in FFA activities, record of occupational work, enterprise or business property inventory, occupational expense account, occupational income account, and a financial statement.	List the kinds of records required for specific supervised work experience projects.	Explain why supervised work experience records are necessary.
	Use, as examples, records from successful projects conducted by students in the 11th and 12th grades. Be sure that permission has been granted for a class review of these records.		
	Using New York State Records for Occupational Experience in Agricultural Education, show how to post, summarize, and analyze supervised work experience records. These records are available from IMS at Cornell University.	Complete a set of supervised work experience records for a specific project.	Keep accurate and neat supervised work experience enterprise records. Student records will be evaluated for accuracy and completeness.
	Show students how to set up and keep their permanent cumulative record folders. Explain how this information is used for FFA and student followup studies.	Post information in the permanent cumulative record folder.	The student's permanent cumulative record folder will be evaluated for neatness, completeness, and accuracy.

Getting Along on the Job (6) • Attitudes • Habits • Job performance	Develop with students a list of the personal characteristics and attitudes desired by employers. Discuss how these characteristics help students get along on the job.	Make a list of the personal characteristics that employers like employees to possess.	Explain how attitudes and work habits affect productivity at work. Explain why employers like to find certain characteristics in the people they hire.
	Describe a work situation in which tension exists between two workers and show how attitudes and work habits are affected.	Make a list of situations that could affect a student's performance in school.	Given a specific work related conflict, discuss how the situation could be corrected or avoided.
	Discuss standard management procedures that might be used to reduce tension and conflicts to the job. Develop with students things that workers can do to minimize conflicts and tension in work situations.	Make a list of job situations that could lead to conflicts among workers.	
Government Regulations Affecting Employment of Minors (7) • State • Federal	Discuss State and federal labor laws and regulations affecting the employment of minors on farms or in agribusinesses.	Summarize major points relating to federal and State labor regulations and minimum wage standards, and file in notebook.	List State and federal regulations that affect the employment of minors on farms or in agribusinesses. Give the minimum wage standard for students employed on farms or in agribusinesses.
	Explain the Occupational Safety and Health Act (OSHA) and discuss the hazardous occupations that exist in the agriculture industry.		
	Discuss the provisions in federal legislations that allow students enrolled in vocational agriculture specific exemptions as student learners and trainees. Comment on the need and purpose of Workmen's Compensation.		

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Government Regulations Affecting Employment of Minors (cont'd)	Explain how to obtain a Social Security card, working papers, employment certificate, and tractor and farm machinery certification.	Fill out application for working papers. Acquire tractor and farm machinery certification permits.	
	Discuss the current regulations and standards relative to power takeoff machinery guarding, farm equipment operating instructions, and electrical equipment regulations and standards.	Make a list of farm field equipment operating instructions that are required to be given to all employees by the employers to insure knowledge of safe operating practices of equipment.	Explain the reasons for power takeoff guarding and operating instructions of farm field equipment.
	Invite an employer to discuss minimum wages; fringe benefits; withholding for Social Security, State, and federal taxes; and federal and State income tax obligations.	Summarize key points made by the speaker, and file in notebook.	
Complete Work Experience Agreements (8) • Employer • Parent • School	Discuss briefly contracts, mortgages, leases, and other legal agreements.	Summarize terms and conditions of legal agreements, and file in notebook.	
	Develop with students the elements needed in a work experience agreement. Assist students to write specific work experience agreements.	List the elements needed in a work experience agreement.	Write a work experience agreement for a real or hypothetical situation.
	When visiting work experience projects, discuss with parents and employers the importance of having written work experience agreements.		

FFA Degrees and Awards (9)	Discuss the relationships of supervised work experience and the FFA chapter activities including the degree and award programs. Show films and slides of previous award winners and selected students with their work experience projects. Develop with students a list of and requirements for FFA awards and degrees. Examine former and current upper class students' award and degree applications with supportive records. Be sure that permission has been granted for a class review of these records. Obtain State and national FFA award applications from State FFA office.	Make a chart showing local, State, and national awards and degrees available to agricultural students who are members in good standing of the local FFA chapter. Include the qualifications and recognitions received for award and degree winners.	Apply for appropriate FFA awards and degrees.

SHOP AND LABORATORY PROCEDURES

Unit 5

Class Sessions - Course 1 — 3 Course 2 — 3

Objectives

After completing this area of instruction, students will be able to:

(1) Demonstrate, by daily behavior, safe work procedures.

(2) Select and wear recommended protective clothing and devices when required for specific situations.

(3) Use hand and power tools safely.

(4) Use farm machinery and equipment safely.

(5) Handle chemicals, reagents, and pesticides safely.

(6) Follow recommended fire prevention procedures under all circumstances.

(7) Participate in a safety program through FFA activities.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Safe Work Procedures (1) • Shop • Land laboratory • Field trips • Supervised work experience programs	Discuss the responsibilities of the students and teacher for maintaining safe working conditions during school and after school activities.	List the responsibilities of the student for maintaining safe working conditions during all school activities.	State the school's safety policy related to all school activities.
	Explain the school's policy related to student conduct and behavior.		State the school's policy related to student conduct.
	Develop with students a list of safety procedures to follow when working in the school shop, at the land laboratory and work experience locations, and on field trips.	List the safety procedures to be observed by all students when working in the school shop, at the land laboratory and supervised work experience locations, and on field trips. File in notebook.	Explain the importance of working safely in all school-related activities.

	Discuss with students the general safety procedures to follow when using ladders.	List the safety procedures that need to be followed when using ladders.	
	Make a tour of the school shop facility. Point out the specific safety practices that apply to the different areas.	List the safety practices that apply to specific areas of the shop.	Follow prescribed safety procedures when working in the school and home shops.
	Explain the meaning of the color coding system used in the shop facility. See OSHA regulation 1910.144 (ANSF Standard 253.1).	List the meaning of the various colors used in the shop's color coding system.	
	Discuss the cleanup procedures for the school shop.		Participate willingly in the daily cleanup of the school shop area.
Personal Protective Devices (2)	Show students how to select and use recommended eye protection devices, ear plugs, hard hats, gloves, shoes, and protective clothing when required for specific situations.	Use the recommended protective clothing and devices when required for specific situations. Adjust for proper fit and comfort.	List all the personal protective items needed when working in the shop and at the land laboratory facilities.
	Show films or filmstrips on the use of various protective devices.		
Safe Use of Hand and Power Tools (3)	Demonstrate and discuss the use of all the hand and power tools that will be used by students.	Demonstrate to the instructor's satisfaction the safe operation of all the hand and power tools available in the shop.	
	Discuss ways of preventing electrical shock when using power tools.	List ways of preventing electrical shock when working with power tools. File in notebook.	Check all power tools for electrical hazards before using them. Report to the instructor any damaged or defective equipment so that it may be removed from service and repaired.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Safe Use of Hand and Power Tools (3) (cont'd)	Use safety materials and show filmstrips on the operation of the power tools that will be used by the students.	List the key points made in each film, and file in notebook.	
	Develop worksheets for each power tool that will be used by the students.	Complete a worksheet for each power tool, and file in notebook.	
	Develop safety tests for each power tool that will be used by the students. Require each student to successfully pass all safety tests before operating any power tool. Be sure that all answers are written by the student and the test is signed and dated. File in student's folder.		Pass successfully the safety test for each power tool that will be used in the shop. Use safely all hand and power tools available in the shop.
Safe Use of Farm Machinery and Equipment (4)	Discuss with students the rules and laws governing the use of tractors and machinery at the land laboratory or on school property. Refer to the tractor certification outline.	List all the regulations and laws pertaining to use of tractors, farm machinery, and equipment. File in notebook.	
	Show a film or filmstrip on tractor safety.	Demonstrate to the instructor's satisfaction the safe operation of a tractor and all other machinery used at the land laboratory.	Pass successfully the safety tests for tractors and all other farm machinery that will be used during the school year.
	Develop safety tests for the operation of tractors and all other farm machinery and equipment that will be used by students. Require students to successfully pass tests for the tractor and all other machinery they expect to operate at the land laboratory or supervised work experience location.	Complete tractor certification requirements.	Use tractors and all other farm machinery safely at the land laboratory and supervised work experience location.

Safe Use of Farm Machinery and Equipment (cont'd)	Demonstrate the hand signals used when working with agricultural machinery and equipment.		Use the standard hand signals when working with agricultural machinery and equipment.
Safe Use of Chemicals, Reagents, and Pesticides (5)	Demonstrate and explain how to pour, mix, use, dispose of, and store chemicals, reagents, and pesticides.	List all the procedures to follow when using chemicals, reagents, and pesticides. File in notebook.	Properly use, dispose of, and store all chemicals, reagents, and pesticides used in the instructional program and on the home farm.
	Discuss the procedures to follow to counteract the ill effects of chemicals, reagents, and pesticides when they are spilled, ingested, or inhaled.	List the procedures to follow to counteract the ill effects of chemicals, reagents, and pesticides when they are spilled, ingested, or inhaled. File in notebook.	
Fire Prevention (6)	Discuss with students general fire prevention procedures. Include such topics as using, disposing, and/or storing of flammable materials.	List precautions to take to prevent fires when working in the school shop, and file in notebook.	Follow general fire prevention procedures when using, disposing, and/or storing of flammable materials.
	Discuss the different types of fires and the fire extinguisher to use to control each.		List the different types of fires and the kind of fire extinguisher to use for each.
	Point out the location of the fire extinguishers in the shop, and indicate the type of fire each controls.		Locate the fire extinguisher in the shop, and indicate the specific type of fire controlled by each.
	Explain how to use a fire extinguisher to put out a small fire.		Explain how to use a fire extinguisher to put out a small fire.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Participate in FFA Safety Program (7)	Establish a standing FFA safety committee. Develop a list of safety situations related to the instructional program.		Participate in the FFA chapter's safety awards program.
	Arrange to have the school nurse discuss with students first aid for minor injuries, including electrical shock and burns, and the precautions to take in emergency situations. All of the procedures and precautions discussed should follow the policies established by the school system for such situations. Advise students they are to report to you immediately any injuries no matter how minor they appear to be.	Summarize the key points made by the speaker, and file in notebook.	

AGRICULTURAL WELDING

Unit 6

Class Sessions - Course 1 — 15 Course 2 — 10

Objectives

After completing this area of instruction, students will be able to:

(1) Describe seven job opportunities in agriculture where skills in welding are needed.

(2) List five situations where welding is used in agriculture.

(3) Identify metals used in agricultural welding.

(4) Prepare metals for welding.

(5) Select electrodes and amperage settings for specific arc welding jobs.

(6) Follow safe work procedures when arc welding.

(7) Set up equipment for arc welding.

(8) Strike an arc and run a bead.

(9) Make a butt and fillet weld using an arc welder.

(10) Control distortion of metal when welding.

(11) List the characteristics of a high quality weld.

(12) Follow safe work procedures when oxyacetylene welding.

(13) Prepare oxyacetylene equipment for welding and shut down the equipment at the conclusion of a job.

(14) Use oxyacetylene welding equipment to fuse, braze, and cut metals.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Agricultural Welding (1)	Discuss with students job opportunities related to agriculture that require welding skills.	Visit the guidance office, and compile a list of agricultural jobs that require skills in welding.	Describe seven job opportunities in the field of agriculture that require skills in welding.
	Arrange a field trip to a custom welding shop or a farm shop where welding is done to discuss career opportunities in welding.	Summarize the main points observed on the field trip, and file in notebook.	List the career opportunities in agricultural welding that are available in the local area.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
	Invite a welding equipment manufacturer's representative to discuss the qualifications, training requirements, hours, wages, and opportunities for welders in agriculture.	Summarize the main points made by guest speaker, and file in notebook.	
Situations Where Welding Is Used in Agriculture (2)	Discuss with students the importance of welding in agriculture, and give examples of situations where it is used.	List applications where welding is used in agriculture.	Explain why welding is important to the agriculture industry. List five situations where welding is used in agriculture.
Identify Metals (3) • Appearance • Spark test • Fracture • Sound	Obtain a variety of scrap metals used for welding. Demonstrate the various characteristics used to identify mild and high carbon steel, cast iron, brass, copper, and aluminum.	Develop a chart showing the characteristics used to identify different metals. Practice identifying samples of various kinds of metals.	Given several pieces of iron, steel, brass, copper, and aluminum, identify each piece, and explain how the decision was reached.
Prepare Metals for Welding (4) • Cleaning • Grinding • Positioning • Clamping	Discuss the importance of preparing metals for welding, and explain why specific procedures are followed. Demonstrate welding dirty and clean metals and compare the results.		
	Show students how to clean, grind, position, and clamp metals for welding.	Select two pieces of mild steel and prepare them for welding.	Demonstrate how to clean, grind, position, and clamp two pieces of metal for welding.
Select Electrodes (5) • AWS number and color code • Diameter and amperage required	Demonstrate how to use manufacturers' wall charts for selecting electrodes and amperage settings for specific welding jobs. Explain the American Welding Society's classification and color code for electrodes.	File in notebook information from the manufacturers' wall charts.	

Select Electrodes (5) (cont'd)	Prepare hypothetical jobs (descriptions or actual situations) that students may use to practice selecting electrodes and amperage settings.	Practice selecting electrodes and amperage settings using teacher-prepared jobs.	Select proper electrodes and amperage settings for specific welding jobs.
Safe Work Procedures When Arc Welding (6) ● Eye safety ● Ultraviolet light ● Burns ● Fire ● Electrical shock ● Chipping flux ● Spatter	Distribute the worksheet on "Arc Welding Safety" that is available from IMS. Discuss the causes of accidents, types of injuries, and safety practices to follow when arc welding.	Complete the worksheet on arc welding safety, and file worksheet in notebook.	Explain procedures to follow to avoid accidents when arc welding.
	Lead a class discussion on the importance of following arc welding safety procedures. Discuss possible accidents, such as; frayed jeans catching fire, burns from hot metal, and eye problems from ultraviolet light.	Give a report on a welding accident, and tell how it could have been avoided.	List the safety procedures to follow when arc welding. Work safely when arc welding.
	Demonstrate how to inspect arc welding equipment and accessories prior to starting to weld.	Prior to welding, inspect all equipment and advise instructor of any hazards and/or defects.	List welding hazards that may affect the safety and welfare of the operator. Explain how these can be corrected.
	Indicate the necessity of using fire protection measures when arc welding. Point out the location of the fire extinguishers in the area, and discuss how to use them.	Locate the fire extinguishers in the shop facility, and note the specific use for each.	Explain how to use a fire extinguisher to put out a small fire.
	Invite the school nurse to discuss and demonstrate first aid procedures. Explain the school policy relative to administering first aid.	Summarize the main points made by the speaker, and file in notebook.	State and follow the school policy as it relates to administering first aid.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Arc Welding Equipment (7) • AC vs DC • Polarity • Adjusting amperage	Show and discuss filmstrips on arc welding procedures.	Take notes on the key points made in filmstrips, and file in notebook.	
	Demonstrate how to set up the arc welder. See "Modules of Instruction in Agricultural Mechanics" and pamphlets on welding from IMS.	Set up arc welder for welding. Adjust the amperage for the size electrode and metal to be welded.	Demonstrate and explain the reasons for the amperage needed for a specific welding project.
Strike an Arc and Run a Bead (8) • Striking techniques (tap and scratch) • Electrode angle and motion • Arc length	Explain and demonstrate the methods of striking an arc and running a bead.	Practice striking arcs and running beads.	Demonstrate proper procedure when striking an arc.
	Explain how arc length and amperage affects penetration.		Student's bead will be evaluated by instructor.
	Using individualized instruction, help students strike arcs and run beads.		
Types of Welds (9) • Butt • Fillet	Demonstrate how to make a butt and fillet weld.	Practice making butt and fillet welds.	Student's butt weld will be evaluated by the instructor.
			Student's fillet weld will be evaluated by the instructor.
Control Distortion (10) • Clamping • Tacking • Separate welding • Preheating	Show students samples of metals that have been distorted by welding. Explain the reasons for distortion, and show how distortion can be prevented.	Take notes on metal distortion and ways to avoid it, and file in notebook.	Describe why metals become distorted when welded.
		Practice welding with a minimum of metal distortion.	Explain procedures that can be used to prevent metal distortion when welding.
	Demonstrate tack welding.	Practice tack welding.	

Quality of Welds (11) • Bead height, width, and uniformity • Undercutting and spattering	Show, using specific examples, how the quality of a weld influences its strength.	Practice making acceptable welds.	List the characteristics of a high quality weld. Submit welds for evaluation by instructor.
Safe Work Procedures When Oxyacetylene Welding (12) • Eye protection • Oil and grease • Gas leaks • Securing tanks • Burns and fire • Hazards • Ventilation	Distribute the worksheet on "Oxyacetylene Welder Safety" that is available from IMS. Discuss the causes of accidents, types of injuries, and safety practices to follow when using oxyacetylene equipment. Discuss and demonstrate the: • Characteristics of oxygen and acetylene gases • Oxygen and acetylene connections.	Complete the worksheet, and file in notebook.	List 10 safe work procedures that need to be followed when oxyacetylene welding. Work safely when oxyacetylene welding.
Oxyacetylene Equipment (13) • Preparation . Tanks . Hoses . Regulators . Valves	Discuss and demonstrate how to prepare oxyacetylene equipment for welding. See "Modules of Instruction in Agricultural Mechanics" and pamphlets on welding from IMS. Show and discuss filmstrips on oxyacetylene welding.	Follow recommended procedures when preparing oxyacetylene equipment for welding. Check equipment for leaks. Record key points presented in filmstrips, and file in notebook.	Students' preparation of oxyacetylene equipment for welding will be evaluated by the instructor.
. Torches	Discuss and demonstrate uses for the various kinds (welding and cutting) and types (equal pressure and injector) of torches. Demonstrate how to care for and maintain welding and cutting torches.		Students' care and maintenance of welding and cutting torches will be evaluated by the instructor.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
. Tips - Sizes	Discuss and demonstrate the different sizes of welding tips. Explain the numbering system used to indicate tip size.	List the uses for various sizes of welding tips.	
- Selection	Show how to use manufacturer's charts to select the tip size for specific welding jobs.	Select tips needed for specific welding jobs following manufacturers' charts.	Student's selection of tips for specific welding jobs will be evaluated by the instructor.
- Care	Demonstrate how to care for and maintain welding tips. Emphasize the importance of having clean tips and orifices when welding.	Follow recommended procedures when caring for and maintaining welding tips.	Student's care and maintenance of welding tips will be evaluated by the instructor.
● Shutting Down	Discuss and demonstrate how to shut down oxyacetylene equipment at the conclusion of a job.	Follow recommended procedures when shutting down oxyacetylene equipment at the conclusion of a job.	Student's performance to shut down the oxyacetylene equipment at the conclusion of a job will be evaluated by the instructor.
Oxyacetylene Welding (14) ● Lighting and adjusting flame	Demonstrate how to light a torch and produce the following flames: ● Carbonizing ● Neutral ● Oxidizing Explain the heat ranges and uses for each flame.	Light welding torch and adjust for different types of flames.	Student's performance to light torch and adjust flame will be evaluated by the instructor.
● Fusion . Tip selection . Heat range . Distance and motion of tip	Demonstrate how to fuse metals.	Prepare equipment, select tip, light torch, adjust flame, and make a simple fusion weld. Shut down equipment at conclusion of the job.	Quality of the student's weld will be evaluated by the instructor.

• Brazing . Tip selection . Filler rod . Flux	Demonstrate how to braze metals.	Prepare equipment, select tip, light torch, adjust flame, and do simple brazing. Shut down equipment at conclusion of the job.	Quality of the student's brazed joints will be evaluated by the instructor.
Oxyacetylene Cutting (14) • Lighting and adjusting flame	Demonstrate how to light a cutting torch and adjust the flame for cutting various thickness of metals.	Prepare equipment, light torch, adjust flame, and cut metal. Shut down equipment at the end of the job.	Quality of cuts made by the student will be evaluated by the instructor.
• Cutting	Demonstrate how to cut metal with a cutting torch. Explain the importance of preheating the metal, angle and distance tip is from metal, and speed of travel.		

AGRICULTURAL POWER AND MACHINERY

Unit 7

Class Sessions - Course 1 — 25 Course 2 — 10

Objectives

After completing this area of instruction, students will be able to:

(1) Describe 10 job opportunities in agricultural mechanics.

(2) Distinguish between two- and four- stroke-cycle engines.

(3) Service and maintain two- and four- stroke-cycle gasoline engines.

(4) Identify and correct minor malfunctions of a small gasoline engine.

(5) Meet the certification requirements for tractor and machinery operation.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Agriculture Mechanics (1)	Develop with students a list of occupations that relate to agricultural mechanics. Divide class into two teams and have each team list as many job opportunities as possible. For each job, discuss income levels, education and experience needed for entry employment, and the general work conditions.	Bring to class newspaper articles related to jobs in farm mechanics.	From a list of 15 jobs in agriculture, select 10 related to the field of agricultural mechanics, and give the potential income level, education and experience needed to get started, and the general working conditions.
	Discuss with students the individual achievement and Foundation awards that relate to agricultural mechanics.	Make application for local and district level awards in the field of farm mechanics.	
	Arrange a field trip to a small engine or tractor repair shop to discuss career opportunities and investigate working conditions.	Prepare a list of 15 people in the community who realize at least part of their income from agricultural mechanics.	Describe the job skills needed, and working conditions for five careers observed on the field trip.

Occupational Opportunities in Agriculture Mechanics (1) (cont'd)	Arrange, whenever possible, a field trip to a tractor, small engine assembly plant, or an agriculture machinery assembly plant to discuss career opportunities and investigate working conditions.		Prepare a report of the field trip.
Operating Principles of Small Gasoline Engines (2)	Use slides, filmstrips, or transparencies to explain the operating principles of two- and four-stroke-cycle gasoline engines. See "Modules of Instruction in Agricultural Mechanics."	List various applications of small gasoline engines and state whether a two- or four-stroke-cycle engine is used in each situation.	Describe what takes place during the two strokes of a two-stroke-cycle gasoline engine. Describe what takes place during the four strokes of a four-stroke-cycle gasoline engine.
	Explain the advantages and disadvantages of the two- and four-stroke-cycle gasoline engines.	Explain the advantages of the four-stroke-cycle gasoline engine.	
	Discuss and illustrate with a cutaway engine or model the differences between the operation of a two-stroke and four-stroke-cycle gasoline engine.		Explain the differences between two-stroke- and four-stroke-cycle engines.
	Use actual engines to show how a four-stroke-cycle gasoline engine may be identified. Use such items as engine plate, muffler location, oil filler plug, and information from the operator's manual.	Bring to class an engine from home or work and indicate whether it is a two- or four-stroke-cycle gasoline engine.	Explain how the engine brought from home or work was identified. List at least three identifying features. From a collection of five small gasoline engines, state the number of strokes per cycle for each.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Service and Maintenance of Small Gasoline Engines (3)	Demonstrate how to service different types of air cleaners for small gasoline engines.	Explain the procedure for servicing one type of air cleaner for a small gasoline engine.	Service the air cleaner on the gasoline engine brought to school.
	Discuss and show filmstrips, slides, and/or transparencies of the various types of air cleaners that are not available in the shop.		From a collection of air cleaners, name the different types available.
	Discuss the importance of keeping a small gasoline engine free of dirt and debris.		
	Demonstrate how to clean the cooling fins on small gasoline engines.		Clean the cooling fins on a small gasoline engine.
	Explain the need of and demonstrate how to mix oil and gasoline for a two-stroke-cycle engine.	Mix oil and gasoline for a two-stroke-cycle engine.	Explain why oil needs to be added to the gasoline for a two-stroke-cycle engine.
	Explain the need of and demonstrate how to change the oil in a four-stroke-cycle gasoline engine.	Change the oil in a four-stroke-cycle gasoline engine.	Explain why it is necessary to change the oil in a four-stroke-cycle engine.
	Use filmstrips, slides, or transparencies to show the operation of the ignition system on a small gasoline engine.	List all the parts of the ignition system of a small gasoline engine.	Explain the function of each part of the ignition system on a small gasoline engine.
	Discuss and show the parts of an ignition system of a small gasoline engine.	Make a panel board containing small engine parts and label each part.	Name the ignition parts on panel board after labels have been covered or removed.
	Discuss and illustrate with samples the different heat ranges, reach, and sizes of spark plugs.		Label sample spark plugs according to size, heat range, and reach.

Service and Maintenance of Small Gasoline Engines (3) (cont'd)	Use worn spark plugs to show how engine problems can be identified by examining the condition of the spark plug.		Bring to class spark plugs from small gasoline engines used at home. Analyze their condition for possible engine malfunctions.
	Demonstrate how to locate the points and condenser of a small gasoline engine. Remove the flywheel, if necessary.	Locate the points and condenser of a small gasoline engine.	
	Demonstrate how to remove and replace the condenser, and to remove, replace, and adjust the points of a small gasoline engine.		Remove, clean, and replace the points and condenser of a small gasoline engine.
	Demonstrate how to clean the carbon from the exhaust ports of a two-stroke-cycle gasoline engine.		Clean the exhaust parts of a two-stroke-cycle gasoline engine.
Correcting Malfunctions of Small Gasoline Engines (4) • Ignition system	Demonstrate how to check the ignition system of a small gasoline engine for spark.	List the steps for checking the ignition of a small gasoline engine. File in notebook.	Check the ignition system of a small gasoline engine for spark.
	Demonstrate how to check, adjust, and set the magento air gap of a small gasoline engine.		Check and adjust the magneto air gap of a small gasoline engine.
	Demonstrate three methods of checking compression of a small gasoline engine (spin, thumb, and gauge).	List the steps for checking the compression of a small gasoline engine.	Test a small gasoline engine for compression, and explain how to interpret the results.
	Explain how to use compression readings.	Take compression readings of several small gasoline engines, and compare each with the manufacturer's specifications. Mark the engines that are below recommended specifications.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
● Fuel system	Demonstrate how to check the fuel delivery system of a small gasoline engine.	Check and clean the fuel system of a small gasoline engine.	Clean and check the fuel system of a small gasoline engine.
	Explain the operation and show samples of suction, float, and diaphragm types of carburetors normally found on small gasoline engines.	Check the type of carburetor found on small gasoline engines used at home.	Explain the operation of three types of carburetors found on small gasoline engines.
	Demonstrate how to adjust the carburetor of a small gasoline engine. Use the owner's manual to locate carburetor settings.		Adjust the carburetor of a small gasoline engine following manufacturer's recommendations.
	Demonstrate how to find and correct malfunctions of a small gasoline engine that will not start. Include only the basic engine parts and operations which have been discussed in class.	Explain the step-by-step procedure to follow when correcting basic malfunctions in the ignition and fuel systems of a small gasoline engine.	Troubleshoot and correct the basic malfunctions of a small gasoline engine that will not start. State the compression reading for the engine.
	Engines for instructional purposes may be obtained from local small gasoline engine dealers.		
Tractor Operation, Maintenance and Safety (5)	Distribute to students copies of the *4H - Safe Tractor Operation* workbook and explain the assignment.	Study the *4H - Safe Tractor Operation* workbook.	
● Service and maintenance (small and large tractors) . Lubrication . Battery service . Cooling system . Fuel system . Tires . Filters- oil, gas, air	Plan a supervised study period for students to work on *Tractor Operation* books.	Complete the worksheets for each lesson in the *4H - Safe Tractor Operation Workbook.*	Pass a written test on the required safety and maintenance procedures as outlined in the tractor certification program.
	Explain the necessary service and maintenance checks that should be performed on tractors. See "Modules of Instruction in Agricultural Mechanics."		Perform necessary maintenance checks on the tractors provided by dealers.

Tractor Operation, Maintenance and Safety (5) (cont'd)	Discuss with students the operating instructions that are required to be given every employee prior to operating farm equipment.		List the instructions that are required to be given every employee prior to operating farm equipment.
● Certification requirements for farm machinery and implements . Highway . Field	Demonstrate, using toy model tractors, the principles of safe tractor operation and potential accident situations.	Inspect local tractors either at home or at area farms for potential hazards.	Explain procedures to follow when operating farm tractors that will help reduce accidents.
	Invite a guest speaker to relate his/her personal experiences with farm accidents. (farmers, police, ambulance corps, extension).	Summarize the key points made by the speaker, and file in notebook.	
	Keep a collection of newspaper articles that relate to common and unusual farm accidents.	Review newspaper articles that relate to farm tractor accidents, and make a list of the indicated causes.	
	Survey class to determine those who have suffered tractor accidents, and have each one indicate how the accident could have been prevented.	Relate to class causes of tractor accidents, and indicate how each one might have been prevented.	
	Show slides, filmloops, filmstrips, or films on tractor safety.	Summarize the key points on tractor safety, and file in notebook.	
	Invite a safety expert to discuss State and federal laws and safety regulations relating to tractor operation (police, safety engineer).	Summarize the key points made by the guest speaker, and file in notebook.	
	Secure tractors from local machinery dealers on a loan basis for use in practice driving.	State the differences among the tractors provided, and show the location of all controls.	Locate and use all the controls on the tractors provided.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Tractor Operation, Maintenance and Safety (5) (cont'd)	Obtain two-wheel trailers from local farmers for use in driving exercises.	Check at home or with neighbors on available trailers, and prepare a list of people who are willing to provide this equipment for student use.	
	Arrange a field trip to a farm equipment dealer, and ask a salesperson to explain the safe operation of various types of farm machines and implements.	Report to class on the safety procedures emphasized by the dealer.	
	Discuss the laying out of a practice course for tractor operation.		
	Supervise the laying out of a tractor course for a safety test following the specifications in the 4H Extension Service manual.	Practice driving tractors using the official course.	Pass a tractor driving test as stipulated in the certification program.
	Teachers of agriculture and 4H Agents may cooperate to conduct a countywide safety program.	*Time outside of class may be needed to permit all students to meet the minimum time requirements for driving.*	Operate tractors and farm equipment in a safe, accident-free manner. Seek employer feedback on students' ability to operate tractors and equipment.
	Secure certification cards from Cornell University, Dept. of Ag. Engineering, and issue to students passing the tractor and machinery certification requirements.		Pass a written and practical exam on machines or implements used as set forth in Extension Service Requirements, or by the teacher of agriculture.

AGRICULTURAL STRUCTURES

Unit 8

Class Sessions - Course 1 — 10 Course 2 — 25

Objectives

After completing this area of instruction, students will be able to:

(1) Describe five job opportunities related to the field of agricultural structures.

(2) Measure to the tolerances required for the task using the customary and metric systems.

(3) Select and use safely hand and power tools to perform specific carpentry operations.

(4) Follow safe work procedures when doing simple carpentry construction and/or maintenance work.

(5) Select and use safely tools to mix, pour, and finish concrete for specific jobs.

(6) Select blocks for specific building structures and jobs and explain reasons for the choice.

(7) Mix mortar, lay out job, and lay blocks for specific situations.

(8) Solve problems relating to voltage, amperage, wattage and resistance.

(9) Wire switches, lights, outlets, and junction boxes in conformance with provisions of the National Electric Code.

(10) Perform routine maintenance on electric motors.

(11) Select and use safely tools to perform plumbing jobs.

(12) Select and use safely tools and materials to brush and/or spray paint.

(13) List reasons for providing adequate ventilation in painting areas.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Agricultural Structures (1)	Invite a local contractor and/or State Employment Service personnel to discuss jobs available in the area of agricultural structures such as plumbing, masonry, carpentry, and electrical work. Develop with students questions to ask the guest speaker about the qualifications, availability, and preparation for jobs in agricultural structures.	Summarize key points made by guest speaker, and file in notebook.	List five job opportunities related to agricultural structures. Explain the qualifications needed to work in the area of agricultural structures.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Measure Using the Customary and Metric Systems (2)	Discuss the importance of measuring to the tolerances required for the task.		Make measurements that are within the tolerances for the task.
	Discuss the basic units of metric measurement that relate to the construction industry (linear).	List the basic units of metric linear measure.	Explain the relationships of the different units of metric linear measure.
	Develop worksheets that require using the customary and metric systems of measurement. Avoid comparing the systems.	Complete worksheets on measuring, and file in notebook.	
Carpentry Operations (3,4) • Tools • Safe work procedures	Show how to use hand tools commonly used to perform agricultural carpentry jobs. Emphasize the safe work procedures related to each tool.	Use hand and power tools safely to build carpentry projects.	From pictures of the actual tools, state the name and give uses for 20 tools commonly used in agricultural construction.
	Demonstrate how to repair and/or sharpen hand tools commonly used to perform agricultural carpentry jobs.	Repair and sharpen personal hand tools.	
	Show how to use and maintain power tools commonly used to perform agricultural carpentry jobs. Emphasize safe work procedures related to each power tool.	Report to the instructor any tool or equipment that you damage or find in a damaged condition so it may be removed from service and repaired.	
	Require each student to successfully pass all safety tests before operating any power tool.		Pass successfully the safety test for each power tool that will be used in this area of the work.
			Demonstrate the use of each power tool used in this area of work.
	Show films or filmstrips on basic hand and power tools used to perform agricultural carpentry jobs.	Summarize main points made in films or filmstrips, and file in notebook.	

Carpentry Operations (3,4) (cont'd)	Arrange for students to select and complete a carpentry project.	Select and complete a suitable carpentry project.	Student's use of hand and power tools will be evaluated by the instructor.
	Discuss the importance of developing a plan and making a bill of material for any construction project.		
	Show how to make a plan and prepare a bill of material for a specific carpentry project.	Draw plans and prepare a bill of material for a specific carpentry project. Construct project carefully and accurately. Upon completion of the project, rate it yourself and present it to the instructor for his/her evaluation.	Student's project plan will be approved by the instructor.
	Arrange for quality projects to be displayed at local, county, and State fairs in the FFA exhibit area.	Complete entry blanks for fair exhibits. Prepare exhibit for display.	Student's completed project will be evaluated by instructor.
Masonry Operations ● Concrete work (5) . Tools . Mixing . Pouring . Finishing	Show a film or filmstrip on basic concrete work.	Summarize main points of film or filmstrip, and file in notebook.	
	Discuss with class the tools needed to do concrete work.	Develop a list of basic tools and equipment needed to do concrete work.	From pictures or actual tools used to do concrete work, name and give uses for five.
	Demonstrate methods of mixing, pouring, and finishing concrete. Emphasize the importance of measuring and testing the raw materials and testing the mix (slump test).	Test samples of sand, gravel, and water. Mix a batch of concrete and make a slump test.	Explain how to test, sand, gravel, and water. Describe the slump test, and explain how to interpret the results.
		Working in small groups, complete a simple concrete project such as a patio block.	Student's concrete project will be evaluated by instructor.
● Block work (6,7) . Select block . Tools . Mix mortar . Lay out job . Lay block	Discuss the various types and sizes of block, and give uses for each.		Give specific uses for five different types of block.
	Demonstrate how to mix mortar for laying block, and how to lay and finish a block wall.	Mix a batch of mortar, and lay a short section of wall including two corners.	Student's section of a wall will be evaluated by the instructor.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Electrical Operation • Terms • Principles • Safety . Shock . Fire	Discuss with students basic electrical terms and principles.	Develop a list of terms used in electricity, and file in notebook.	Explain five terms used in electricity.
	Discuss the prevention of electrical shock and fires.	Follow safe work procedures when wiring and working with electricity.	List ways of preventing electrical shock.
• Electrical problems (8)	Show how to calculate voltage, amperage, wattage, and resistance.		
	Give students problems to solve relating to voltage, amperage, wattage, and resistance.	Solve problems developed by instructor on voltage, amperage, wattage, and resistance.	
• Basic wiring (9) . Splices . Switches - Single pole - 3 way . Boxes - Junction - Switch	Discuss briefly the importance of the National Electrical Code. Discuss the local electrical codes.	List applicable code standards for the local area.	Explain the importance of having electrical codes.
	Demonstrate how to strip wire, make a rattail splice, and fasten wire under a terminal.		From pictures or actual items of electrical parts and tools, name and give uses for each.
	Demonstrate how to do wiring such as: • Controlling a light from one source • Controlling a light from more than one source • Installing a duplex outlet in an existing circuit • Connecting and fusing a branch circuit.	Diagram the various circuits to be wired. In teams or individually, complete the assigned wiring projects, and make the necessary splices and connections in conformance with the National Electric Code.	Student's electrical work will be evaluated by the instructor.
	During the demonstration, show how the applicable code requirements are being satisfied.		
	Provide facilities where students may practice installing electrical circuits involving switches, lights, and outlets.		

• Maintenance of electric motors (10)	Demonstrate the cleaning and general maintenance of common electric motors. Have teams of students clean, and service electrical motors.	Outline the procedures for cleaning and servicing an electric motor. Bring from home a motor to be cleaned and serviced.	Clean and service an electric motor. Work will be checked by the instructor.
Plumbing Operations (11) • Tools and equipment • Pipe . Copper . Galvanized . Plastic • Measuring and cutting • Threading, fitting, and fastening	Develop student worksheet on plumbing tools and equipment.	List the tools and equipment used to do plumbing jobs.	Identify by labeling on worksheet the various plumbing tools used to work with galvanized, copper, and plastic pipe.
	Demonstrate how to measure, cut, thread, and fasten different types of pipe.		
	Discuss and demonstrate how to do plumbing jobs using galvanized, copper, and plastic pipe. Emphasize safe work procedures.	Do simple plumbing jobs involving measuring, cutting, threading, and fastening galvanized, copper, and plastic pipe.	
	Develop a student project that requires measuring, cutting, threading, and fastening various types of pipe.	Measure, fit, and fasten pipe following the instructions on worksheet. File in notebook. Select and build a project that requires plumbing skills.	The student's work in plumbing will be evaluated by the instructor.
Painting (12) • Materials . Selection . Uses . Preparation • Equipment . Gun . Brush • Surface preparation • Application	Discuss with students the use, selection, preparation, and storage of various types of painting materials.	List the steps to follow when preparing paint for use. File in notebook.	Select and prepare paint for use in specific situations.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Painting (12) (cont'd)	Explain how to prepare a surface for painting.	List the steps to follow when preparing a surface for painting. File in notebook.	Prepare surfaces for the application of paint.
	Demonstrate how to apply paint using different methods and equipment (brush and spray).	List the steps to follow when applying paint. File in notebook.	Apply paint to a prepared surface.
	Demonstrate how to clean paint brushes and spray guns, and prepare them for storage.	List the procedures for cleaning painting equipment. File in notebook.	Cleanup at least one brush and a spray gun and store.
• Safety procedures . Ventilation (13)	Discuss safety procedures to follow when painting. Emphasize that painting, especially spraying, should be done only in areas with adequate ventilation.	List the safety procedures to follow when painting.	
	Arrange for students to have a project to paint, using brush and spray techniques.	Bring from home a project to be painted.	Complete a painting job including the selection, preparation, cleanup, and storage of materials and equipment. The student's painting job will be evaluated by the instructor.

SOIL SCIENCE

Unit 9

Class Sessions - Course 1 — 10 Course 2 — 15

Objectives

After completing this area of instruction, students will be able to:

(1) Describe six job opportunities in the area of soil science.

(2) Explain the role that soils play in everyday occurrences.

(3) Describe the origin and composition of soils.

(4) Explain how soils are classified.

(5) Take soil samples, test for nitrogen, phosphorus, and potash, and interpret results.

(6) Make a soil pH test, and interpret results.

(7) Classify land sites as to their best possible uses.

(8) Explain the need for and development of a conservation land plan.

(9) Explain the ecology of soils and soils management.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Soil Science (1)	Develop with the class various jobs related to the field of soil and agronomic science. See materials available from IMS.	Visit the school's guidance office and compile a list of titles and requirements for jobs in the area of soil and agronomic science.	
	Select students to write to State and Federal Agencies, Civil Service, and private industry for information pertaining to careers in soil science.	Write to State and Federal Agencies and private industry for information on careers in the area of soil science.	Share with the class the information on careers in soil science obtained from writing to governmental and private sciences.
	Invite a soil conservationist from a governmental agency to discuss kinds, requirements, and outlook for jobs in the area of soil and agronomic science.	Summarize key points made by the guest speaker. File in notebook.	Describe six jobs related to soil and agronomic science.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Soil Science (1) (cont'd)	Discuss with the class soil and water management awards available through the FFA. Encourage interested students to apply for awards related to their supervised work experience programs.	Apply for FFA Foundation medals and individual achievement awards in the following areas: • Soil and water management • Conservation mechanics • Conservation placement Participate in county soil conservation essay contest.	
Importance of Soil (2) • Agriculture • Construction • Home owner • Recreation	Discuss with the class the role that soil plays relative to everyday occurrences.	Report to class information gathered from TV and radio programs and newspaper and magazine articles that show the importance of soils in daily living.	Describe the effect that soils have on everyday occurrences.
	Develop with students a wall chart showing the values of crops grown in the county (see county census data).		Explain how soils affect the economy of the community.
Origin of Soils (3)	Discuss with the class the origin of soils. Indicate how glaciers, water, and wind contributed to the formation of soils.	Collect local soil samples, and build a display showing the different kinds of soil deposits. List the various stages of soil formation.	Explain the origins of soil.
	Show a filmstrip such as "Soils" which depicts the origin of soil. Material is available from IMS.	Record the main points presented in the filmstrip, and file in notebook.	

Composition of Soils (3)	Discuss the composition of soil. Use a transparency to show how different proportions of water, air, organic matter, and minerals affect the composition of soils. Distribute a handout showing different proportions in various types of soil.	Label the handout on soil composition prepared by instructor, and file in notebook.	List four factors which affect the composition of soil.
	Explain soil texture, structure, and color. Use handouts such as "Soil Structure," "Soil Color" and "Soil Texture" that are available from IMS.	File the handouts on soils in notebook.	
	Using samples of soil collected by students, demonstrate how to determine soil texture and structure. Show how to classify soil samples according to the textural class pyramid chart.	Determine, in the laboratory, the texture and structure of selected soil samples. Record results, and file in notebook.	Determine the texture and structure of an unknown soil sample.
	Arrange a field trip to study a soil profile. Discuss how the various horizons were formed and the structure of the soil. Explain how blocky or platy structure affects soil tilth.	Name the horizons of a given soil profile.	
		Prepare soil profile displays using wooden boxes 6" wide, 2" deep, and 24" long. Each box needs to have one 6" by 24" side of transparent plastic.	Discuss the characteristics of each soil horizon in three soil profile displays.
Classification of Soils (4) • Definition of soil classes	Using soil survey information, discuss with students how soils are classified. Use, as examples, the local soil types.	Using soil survey references, locate and name the various types of soil in the area. Write the characteristics of each soil, and file in notebook.	List the soils in the area, and discuss how these soils are classified.
Testing and Analyzing Soils • Take soil sample (5)	Arrange a field trip to a plot of school land, a local farm, or garden to demonstrate the procedure for taking and preparing soil samples for laboratory analysis. Discuss the importance of each step in the demonstration. Use handouts on collecting and prepare soil samples for testing that are available from IMS.	List the steps to follow when taking and preparing soil for testing.	Bring to class several samples of soil for testing.
		File in notebook handouts on collecting and preparing soil samples for testing.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
● Test soil for nutrients (N,P,K) (5)	Using the soil sample collected on the field trip, demonstrate how to test soil for nitrogen, phosphorus, and potash. Discuss how to interpret the results, and make fertilizer recommendations.	Using a soil testing kit, test soil samples obtained from gardens, lawns, or fields for N-P-K. Record the information in notebook.	Make fertilizer recommendations based on specific soil tests and for a definite crop, vegetable, or nursery stock to be grown.
	Send a soil sample to Cornell University. Compare Cornell's results with those obtained by the students testing an identical soil sample.	Using a soil testing kit, test a soil sample identical to the one sent to Cornell University. Compare the results of the two tests.	
● Test soil for acidity (6)	Discuss the purpose of a pH test. Demonstrate how to make a pH test using a kit. Discuss how to interpret the results, and make liming recommendations.	Using a pH test kit, test soil samples from garden plots, lawns, school grounds, or fields.	Using the pH tests on soil samples from gardens and/or fields, make liming recommendations for specific crops.
			Test an unknown sample of soil for acidity, and make liming recommendations for specific crops.
● Land Use (7) . Crops . Forest	Discuss and illustrate with slides the factors used to judge and classify land sites.	List the factors used to judge and classify land.	Explain how to judge and classify land.
	Explain and show how to use the land judging card when figuring the slope, drainage, and class of a specific site.	Use the land judging card to assist in classifying a specific site.	
	Divide class into teams of two or three students and, using a land level, calculate the slope on a nearby area.	Record land slope information, and file in notebook.	Explain how the slope of a site affects its land use capabilities.

● Land Use (7) . Crops . Forest (cont'd)	Ask a soil conservation technician to arrange a field trip to show the procedures used to judge a given field or forest site and arrive at a land classification number. Then, go to another site, and have students practice judging land. Check their results with the technician.	Judge specified areas of land as indicated by the instructor. Check results with soil conservation technician.	Judge a specific area of land, and indicate how the land can be best utilized.
	Arrange practice sessions for students interested in participating in FFA land judging contests.	Participate in FFA land judging contests.	
Conservation Land Use Planning (8)	Ask a soil conservation person to discuss the conservation land use plan. Explain why all land owners should have such a plan, and the procedures to use to obtain one.	List reasons why land owners should have a conservation land use plan.	List the steps a land owner must go through to obtain a conservation land use plan.
	Write the soil conservation office for land use plans. Use the information for class discussion.		
	Invite resource people such as county, regional, or State planners to discuss land use planning. Where possible, utilize the local planning board members.	Be prepared to ask questions of guest speakers. Summarize key points made by guest speakers, and file in notebook.	
		Visit a land owner who has a land use plan, and have him/her indicate the benefits he/she receives from the plan.	List benefits a landowner receives from participation in the conservation land use plan.
	Discuss the roles of the Soil Conservation Service including the Soil Conservation District (SCE), Agricultural Stabilization Conservation Services, (ASCS), Agricultural Conservation Program (ACP), and Rural Environmental Assistance Program (REAP).	Develop a chart showing the various agencies with their responsibilties that relate to land use planning. File in notebook.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Ecology of Soils and Soil Management (9)	Discuss the problems that may arise when residual chemicals remain in the soil and/or leach into ponds, streams, and ground water supplies.	List the problems that arise when residual chemicals remain in the soil.	Explain how the air, soil, water, fish, and wildlife can be protected by following basic principles of land management.
	Discuss the problems with soil structure and the quantity of micro-organisms when corn and/or row crops are grown continuously on the same piece of land for an extended period of time.	Locate a field that has been used continuously for row crops and one that has been in a crop rotation plan. Compare the soil texture and the quantity of micro-organisms in each, and report findings to the class.	
	Point out ponds in the area where the algal growth is abundant and where the algal growth is minimal. Discuss the different land uses of the fields that surround each pond.	Locate ponds where the algal growth is abundant and where the algal growth is minimal. Note the land use of the fields surrounding each pond. Report findings, and give possible reasons for the differences.	
	Compare the silt load of streams near cultivated fields with the silt load of streams flowing through wooded and/or grassy areas.	Locate some streams that have a heavy silt load and others that have a light silt load. Note the type of land use near each stream. Report findings, and give possible reasons for the differences.	

AGRICULTURAL BUSINESS MANAGEMENT

Unit 10

Class Sessions - Course 1 — 5 Course 2 — 10

Objectives

After completing this area of instruction, students will be able to:

(1) Describe five job opportunities in the area of agricultural business management.

(2) Analyze their personal financial standing using supervised work experience records.

(3) Select the records needed to conduct an agricultural enterprise, and explain the purpose of each.

(4) Prepare a simple financial statement.

(5) List three sources of credit.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Agriculture Business Management (1)	Invite a bank official, garden and/or farm supplier, or greenhouse manager to discuss training requirements, hours worked, salary, and outlook for a job in business management.	Summarize the key points made by the guest speaker, and file in notebook.	
	Have students visit agricultural businesses to discuss career opportunities and observe working conditions.	Select a career in the area of agricultural business management, and list the competencies and requirements needed to enter and advance in that position.	Give an oral report on a specific career selected. Include reasons for selecting this career.
	Develop with the students the skills needed to obtain, maintain, and advance in five different careers in agricultural business management.	Visit a guidance counselor, and discuss the availability of jobs and the educational requirements for careers in agriculture business management.	List the training needed, working conditions, salary, and outlook for five career opportunities in the field of agricultural business management.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Agriculture Business Management (1) (cont'd)	Show films about FFA Star Farmers that indicate the skills needed to be successful in agricultural businesses.		
	Discuss with students the Individual Accomplishment and Foundation Awards available in this field. Encourage interested students to make application.	Complete application for Individual Accomplishment Award for Agricultural Business Management, and submit to FFA competition.	The student's award application will be evaluated by the instructor before being submitted for competition.
Personal Financial Planning (2) • Banking • Insurance • Credit • Budget • Financial statements	Discuss the principles of personal financial planning. Provide individual instruction as students prepare personal budgets and other records for occupational experience. Use New York State Records For Occupational Experience in Agricultural Education that are available from IMS.	Develop a personal budget, and file in notebook.	From a financial statement for a specific enterprise, analyze the information, and discuss changes which will improve the enterprise. Give reasons for changes recommended.
	Invite a representative from the Extension Service, a bank, or an insurance agency to discuss the importance of personal financial planning from their point of view.	Summarize key points made by the guest speaker, and file in notebook.	Explain the importance of personal financial planning.
	Invite a local bank representative to discuss banking instruments, bank policies, financial statements, and the importance of having a good credit rating.	Summarize the key points made by the guest speaker, and file in notebook.	Explain why credit should or should not be extended in a situation identified by the instructor that involves a student requesting a loan to finance a specific supervised work experience project.
Records (3)	Lead a class discussion on the need for keeping business records.	Bring from home or work experience situation a list of the various records used in the business or enterprise.	Explain the need for keeping simple yet accurate records when operating a business.
	Explain definitions and give uses of terms related to business records.		

Records (3) (cont'd) • Need	Arrange a visit to a business or the school data processing center to determine the types of records kept by the business or school.	List the purposes for each of the different types of records kept by businesses.	
• Types	Discuss the different types of records that are needed to conduct an agricultural enterprise.	Given the necessary information for a specific enterprise, prepare a simple profit and loss statement.	List the records needed to conduct an agricultural enterprise, and give the purpose of each.
	Briefly discuss how to keep the following records: • Account (receipts and expenses) • Inventory • Depreciation schedule • Labor and wages • Cash flow	Keep accurately the records needed for your supervised work experience project.	Submit applications and records for FFA awards. Applications and records will be evaluated by the instructor before being forwarded.
• Uses	Discuss and give examples of how records are used for the following purposes: • Becoming established in business • Securing credit • Filing tax returns • Calculating depreciation • Analyzing a business		Discuss how the use of the proper types of records could be helpful in making sound management decisions.
Financial Statements (4) • Assets • Liabilities • Net worth	Discuss how the strengths and weaknesses of a business can be determined from a financial statement.	Using financial record sheets provided by the instructor, complete a personal financial statement.	Explain uses made of financial statements.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Sources of Credit (5) • Individuals • Banks • Loan companies • Production Credit Assoc. • Federal Land Bank • Farmer's Home Administration			Using a set of records for an enterprise, explain the strengths and weaknesses of the project. Given the necessary information, prepare a simple financial statement for a business.
	Lead a class discussion on the importance and sources of credit. Develop a worksheet to be used with materials on credit that are available from IMS.	Read materials on credit, and complete the worksheet provided. File in notebook.	List the advantages of having a good credit rating. Name three agencies that provide loans for agricultural businesses.
	Invite a local businessperson to discuss how business activities are financed.	Record key points made by guest speaker, and file in notebook.	
	Have students visit a local establishment during business hours, and talk with management personnel about financing procedures.	Summarize the key points made by personnel of the business visited, and file in notebook.	

ENVIRONMENTAL PROTECTION AND SAFETY

Unit 11

Class Sessions - Course 1 — 7 Course 2 — 15

Objectives

After completing this area of instruction, students will be able to:

(1) Describe five job opportunities in the area of environmental protection and safety.

(2) Explain and give examples of five terms associated with the environment.

(3) List five major factors that make up the environment.

(4) List the regulating agencies that monitor the environment.

(5) Follow the laws relating to environmental protection and safety.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Environmental Protection and Safety (1)	Develop with students a list of jobs related to environmental protection including the skills needed to obtain, maintain, and advance in a career in environmental protection and safety.	Visit a guidance counselor, and discuss the job opportunities and educational requirements for careers in environmental protection and safety.	Describe five career opportunities related to environmental protection and safety.
	Discuss with students Individual Achievement and Foundation Awards in the area of conservation and natural resources. Encourage students with special interest to apply for appropriate FFA awards.	Complete application for Individual Achievement Awards in conservation and natural resources.	Student's application for awards will be evaluated by the instructor before being submitted for competition.
Environmental Terms (2) • Environment • Ecology • Ecosystem • Pollution • Conservation	Discuss and give examples of terms associated with the environment. Use environmental materials available from IMS.	Define ecology in own terms.	Given a list of environmental terms and a list of definitions, match each term with the correct definition.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Environmental Factors (3) • Water . Underground . Aboveground • Soil . Erosion . Urban development . Roads • Air . Pollution • Animals . Extinction . Overpopulation . Population cycles • Plants . Species change . Harvesting methods • Man . Population . Food . Pollution	Discuss with the students the various factors that make up the environment such as soil, air, water, animals, plants, and man. Show a filmstrip such as "Agriculture and the Environment" (available from IMS) to help identify the specific factors.	List the factors that make up the environment.	
	Discuss, for each factor, the steps that should be taken to help preserve the environment. Use material available from IMS.		For three environmental factors, explain steps that can be taken which would help preserve the environment.
	Arrange a field trip to visit a local land fill or sewage treatment facility. Discuss the procedures followed and the importance of such facilities to the environment. Take pictures of visit to use in a class presentation.	Record the main points observed on the field trip, and place in notebook.	
	Develop with students a list of environmental problems in the community that are adversely affecting the environment.	List environmental problems that exist in the communities.	Give three specific examples of how the environment has changed in the community or area during the past five years. Name and explain the factors responsible for these changes.
	Obtain pictures showing environmental problems, and post on classroom bulletin board. Use these as the basis for a discussion of possible solutions for specific environmental problems. Treat local topics tactfully and constructively.	Bring in pictures on environmental problems existing in the community.	Explain steps that should be taken to deal with two problems relative to environmental deterioration.

Environmental Factors (3) (cont'd)	Have students collect water samples from ponds, lakes, streams, and rivers. Demonstrate how to test water samples. Discuss the results and make recommendations that will maintain or improve water quality.	Collect samples of water from ponds, streams, lakes or rivers, and test purity and quality.	Using unknown water samples, test and record data showing amounts and types of sediments, organic matter, and pollutants. Compare results with those obtained by teacher.
	Take slides that show practices being followed which improve the local environment.	Participate through the FFA in a community roadside cleanup campaign.	List three ways that agricultural practices have improved or damaged the local environment.
Regulating Agencies (4) • Federal . Environmental Protection Agency . U.S. Department of Agriculture	Develop with students a list of governmental regulating agencies that monitor the environment in the following areas: land use, game, water, air, noise, and pesticides.	Write letters to governmental agencies requesting information pertaining to current environmental protection and safety regulations under their jurisdiction. Record and file information in notebook.	Given a list of six environmental problems, name the regulating agency responsible for monitoring each.
• State . Department of Environmental Conservation . Department of Agriculture and Markets . Department of Health	Compile a list of regulations related to the environment that affect land owners and businesses in the community, area, or region. Discuss how each regulation protects the environment.	Visit land owners and business persons in the area to observe and find out what they are doing to protect the environment. Report findings to class.	Explain why environment regulations are needed in today's world.
• Local . County Boards . Village Boards . Town Boards . City Councils	Arrange for the students to visit village, town, or county board members to find out their views on environmental protection and safety.	Summarize main points made by officials visited, and file in notebook.	
		Attend a local governmental board meeting to observe how local environmental problems are handled.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Laws Relating to Environmental Protection and Safety (5) ● Land use . Planning boards . Zoning . Agriculture districts . Land development rights . Easements ● Game laws . Hunting trapping fishing . Licenses . Bag limits . Seasons ● Pure Water Act . Stream Protection Law . Stream classification . Health regulations ● Noise abatement . E.P.A. Standards . State Standards ● Pesticide regulations	Invite a representative from the New York State Department of Environmental Conservation to discuss the laws that relate to environmental protection and safety and how they are enforced.	Interview a person in the community who has been or is working with a regulating agency to find out the purpose of the agency and how the environmental regulations are enforced. Report to class the results of the interview.	
	Compile, with students, a list of regulations affecting land owners and businesses relating to the application of sprays, land use, game laws, water, air, and noise.	Select an environmental regulation, and collect information on it. Report findings to class.	List four ways that laws and regulations have improved the environment.
	Divide class into teams of two or three students. Have each team select and research a group of environmental regulations.	Write a report on an environmental regulation including background information, purpose, and application of the regulation. Discuss reports in class.	Discuss some of the problems that relate to the enforcement of environmental regulations in the community.
		Apply to proper agency for permits or licenses to hunt, fish, improve streams, or burn brush.	

RENEWABLE NATURAL RESOURCES

Unit 12

Class Sessions - Course 1 — 12 Course 2 — 10

Objectives

After completing this area of instruction, students will be able to:

(1) Describe five job opportunities in the area of renewable natural resources.

(2) State the location of the general forest areas in New York State.

(3) Describe the importance of the forests to the State's economy.

(4) Explain the multiple-use concept of forest lands.

(5) Name by sight 25 different species of trees and shrubs.

(6) Explain how to improve a woodlot by thinning and pruning.

(7) Name by sight 20 different species of wildlife and fish.

(8) Explain the reasons for changes in wildlife population.

(9) Explain five principles of game management.

(10) Describe how a habitat can be improved by using tree and shrub plantings and stream improvement.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Renewable Resources (1)	Invite a person working in the area of renewable resources to discuss educational and personal requirements, training needs, working conditions, and opportunities for jobs in his/her area of employment.	Prepare a list of questions to ask resource person. Record the main points made by the speaker, and file in notebook. Invite other interested students to hear the guest speaker.	Compile a list of careers in the area of renewable resources, and file in notebook.
	Discuss the various employment opportunities in the area of renewable resources in private and public sectors. Use materials from IMS.	Visit the guidance office to find materials relating to occupational titles and job descriptions in the area of renewable resources.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Renewable Resources (1) (cont'd)	Provide interested students an opportunity to make a personal investigation of a career choice in the area of renewable resources.	Select a career, and list the competencies and requirements needed to enter and advance in this position.	Give oral or written report on a selected career in the area of renewable resources.
	Discuss with students the Individual Achievement and Foundation Awards in Conservation Placement, Conservation Mechanics, Wildlife Management, Forestry Management, Environmental Management, Soil and Water Management, and Outdoor Recreation.	Make application for district level awards in the area of conservation.	Student's application for awards will be reviewed by the instructor before being forwarded.
Forest Areas in New York State (2,3) • Importance . Size . Value of products	Discuss and locate on a map of New York State the forest areas with the approximate size of each area.	Describe personal visits made to the forest areas of New York State.	Locate the major forest areas on an outline map of New York State.
	Develop with students a circle graph showing the relative area of forest lands to the local land area in New York State.		
• Products	Develop with the students the economic importance of the products derived from the State's forest lands. Discuss such products as lumber, pulpwood, maple syrup, Christmas trees, and sawdust for livestock bedding. Use materials available from IMS.	Name six different products derived from the forests in New York State.	Explain the contribution that the forests make to the economy of New York State.
Multiple-Use Concept (4)	Lead a discussion with the students on the multiple-use concept of forest lands. Use materials available from IMS.	List ways you have personally used forest areas of New York State.	Give five examples of multiple-use of forests lands in New York State.

Identification of Trees and Shrubs (5)	Discuss and illustrate the leaf characteristics, flowers, fruits, twig, bark, taste, smell, and the growth characteristics of 35 different trees, bushes, and shrubs. Tour the school grounds, and name different species found. Use materials available from IMS.	Bring in 10 samples of trees, bushes, and/or shrubs, and name them using tree identification keys and references. File identified samples in notebook.	From 35 prepared samples of forest trees, bushes, and shrubs, name 25 species correctly.
Timber Stand Improvement (6) • Thinning • Pruning	Lead a discussion on timber stand improvement practices of thinning and pruning and how these apply to local woodlots and forest areas. Use materials available from IMS.	List the steps involved in timber stand improvement.	Explain how to improve a small woodlot.
	Arrange a field trip to a local woodlot. Invite a district forester to discuss and demonstrate thinning and pruning techniques, using hand equipment. See "Modules of Instruction in Agricultural Resources."	Report on practices and methods used in the forest area visited. Record the main points made by the guest speaker, and file in notebook.	State four safety procedures that should be followed when working in the woods.
Identification of Wildlife and Fish (7)	Discuss with the class 30 different wildlife and fish species, and explain the characteristics that aid in identifying each. Use films from New York State Department of Environmental Conservation, Cornell University, and Syracuse University to aid in the identification of the various species. Use also materials from IMS.	Collect pictures of 20 wild animals and/or fish found in New York State. Place in notebook. List the habitat and characteristics of five different species of wildlife and/or fish. File information in notebook.	Name and identify by sight 20 wild animals and/or fish found in New York State. Give a 2-5 minute oral presentation on the characteristics and habitats of a selected animal or fish. Be prepared to answer questions on the selected topic.
Factors Affecting Changes in Wildlife Population (8) • Introduction of species • Seasonal trends • Cycles . Food . Cover . Weather . Population	Lead a discussion on items affecting changes in wildlife population. Consider such topics as the introduction of species, seasonal changes, long range cycles, and environmental changes.	Develop graphs showing the number of animals in relation to the seasons of the year and different long range cycles.	Give three examples of how population dynamics affects the wildlife in an area.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Factors Affecting Changes in Wildlife Population (8) (cont'd)	Provide opportunity for independent study and project activity on wildlife population changes for individuals who wish further information on this topic.		The project selected by student for independent study will be evaluated by the instructor.
Principles of Game Management (9) • Laws and regulations • Stocking fish and wildlife • Game refuges • Predator control	Develop a worksheet for use with materials on game management. Use materials available from IMS.	Complete worksheet on game management.	
	Lead a class discussion on the principles of game management. Include such topics as laws and regulations, stocking, refuges, and predator control. See "Modules of Instruction in Agricultural Resources."		Explain six practices to follow which would ensure adequate wildlife in an area.
	Invite a local conservation officer or biologist to discuss the importance and principles of wildlife management.	List key points made by the resource person on wildlife management. File in notebook.	Explain five principles of wildlife management.
Habitat Improvement (10) • Tree and shrub plantings • Stream improvement	Invite a conservation officer to assist students to plan for habitat improvement at the land lab or on school, public, or private lands. Consider such items as brush piles, tree and shrub plantings, and stream improvements.	Develop brush pile shelters and/or plant trees and shrubs that are beneficial to wildlife. The shrubs and trees can be obtained from the Conservation Department each spring.	Explain how to improve the habitat of an area.
	Divide class into groups of two or three students, and have each group plan and carry out a habitat improvement project on an assigned area.	Work on assigned area and follow plans to completion.	Explain finished project to class indicating practices carried out and why.

ANIMAL SCIENCE

Unit 13

Class Sessions - Course 1 — 20 Course 2 — 20

Objectives

After completing this area of instruction, students will be able to:

(1) Describe seven job opportunities related to the animal science industry.

(2) Discuss the importance of three major areas of animal science, and state their values and affect on the local, State, and national economies.

(3) List the kinds and breeds of animals in the livestock industry.

(4) Discuss criteria used for selecting animals for an enterprise.

(5) Explain animal reproduction.

(6) Explain how genetics is used to influence the production, type or conformation, and performance of livestock.

(7) Describe the housing and equipment requirements for animals.

(8) List three types of digestive systems, and explain how each functions.

(9) Determine nutritional requirements for domesticated animals.

(10) Determine sources of nutrients and feed ingredients used to formulate feeds for domesticated animals.

(11) Develop an animal feeding program for a supervised work experience project.

(12) Explain the importance of following a sound health program when working with animals.

(13) Use approved safety practices when caring for, handling, and managing animals.

(14) Explain the need for following sound management practices when working with animals.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Animal Science (1)	Prepare a bulletin board display indicating various occupational opportunities in animal science.	Prepare a list of ten specific jobs in the community or area that relate to animal science, and file in notebook.	Describe seven specific jobs in the animal science industry. Include qualifications and the employment outlook for each job description.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Animal Science (1) (cont'd)	Develop with students a list of jobs related to rearing, handling, and caring for livestock, pets, and/or laboratory animals.	Using occupational briefs for specific jobs in animal science, develop a chart showing information such as training and educational requirements, nature of work, physical requirements, travel involved, and salary ranges for 10 jobs in the field of animal science.	
	Arrange for students to interview individuals in the field of animal science to find out the training and education required, skills needed, capital outlay required, travel involved, salary range, and employment outlook. Help students develop an interview guide.	Use an interview guide to find out from individuals working in the field of animal science the training and educational requirements, nature of work, travel involved, salaries, and employment outlook for their particular job.	Report to class the results of the interviews with people working in the field of animal science.
	Invite a veterinarian that specializes in small animal care to discuss employment opportunities and qualifications needed for jobs in the field of veterinary medicine.	Summarize main points made by guest speaker, and file in notebook.	
	Arrange for the class to visit an animal breeder, animal hospital, a veterinarian and/or pet shop to explore career opportunities in these areas. Develop a worksheet for the field trip.	Ask questions, and complete the worksheet on the field trip. File information in notebook.	Report to class the observations made on the field trip.
	Invite a person who is employed in the animal science industry to explain such things as educational requirements, openings available, salary, and advantages and disadvantages of his/her job.	Summarize main points made by guest speaker, and file in notebook.	

Major Areas of Animal Science (2) • Laboratory • Pets • Livestock	Discuss the uses and economic values of animals. Include how laboratory animals are used in medical research, the pleasure people derive from having pets, and the use of animals for recreation and livestock purposes. Use material available from IMS.	Bring in newspaper and/or magazine articles that show ways in which laboratory animals are used in research.	Give two specific examples of how animals are used in the laboratory for research. Discuss the personal satisfaction that people derive from having pets.
	Explain the effect of the livestock industry on the local, State, and national economies.		Explain the importance of farm animals to the local agricultural economy.
	Develop with the students a list of the laboratory animals, pets, and livestock found at local research facilities, game farms, retail pet stores, zoos, and farms.	Make a list of laboratory, pet, and livestock animals found in the community. Record information in notebook.	List the kinds of animals which are important in the area, and explain the uses of each.
	Arrange for students to conduct an area animal survey. Divide the class into small groups of students and assign each group a specific area. Develop survey sheets for the project. Use the information gathered by the students to make a master list of the animals found in the area.	Conduct a survey of the livestock found in the area. Indicate the kinds and number of the various animals found.	Discuss three kinds of animals found in the area including the uses and economic importance of each.
Kinds and Breeds of Livestock (3)	Discuss the various kinds and breeds of livestock. Include dairy, beef, swine, sheep, horses, and poultry. Use pictures, films, filmstrips, slides, and/or transparencies to show the different breeds of livestock. See "Modules of Instruction in Agricultural Production."	List different breeds for each kind of livestock, and file in notebook.	List the major livestock enterprises in the area. Name the major breeds of three kinds of livestock.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Kinds and Breeds of Livestock (3) (cont'd)	Prepare a transparency showing the location of the following livestock enterprises in New York State: dairy, beef, horses, poultry, sheep, and swine. Discuss the reasons for the concentration of specific kinds of livestock enterprises in different areas of the State.	Show on an outline map of New York State the location of the major livestock enterprises.	Give reasons for the concentration of specific kinds of livestock in different areas of the State.
	Prepare a worksheet for the study of livestock breeds and their characteristics. Include major breeds, place or origin, characteristics, and availability.	Complete worksheet on breeds of livestock in the area. File information in notebook.	Discuss the origin, characteristics, and availability of the major breeds of livestock important in the community.
	Arrange a field trip to a farm, pet store, or livestock show to observe a variety of kinds and breeds of animals. Ask owners to discuss the characteristics of their specific breeds.	Take notes on highlights of field trips, and file in notebook.	
Selection of Animals (4) ● Breeds ● Pedigrees ● Classification ● Judging ● Production and performance ● Personal preference	Discuss the selection of animals based on breed, pedigree, type or confirmation, production information, and personal preference.		Explain how to select an animal for a livestock project. Discuss the importance of personal preference in making the decision.
	Explain the following terms used in selecting, classifying, and judging animals: grade, purebred, registered, scrub, pedigree, type or conformation, production, and performance.	Write definitions of the terms used in selecting, classifying, and judging animals.	Explain each of the following terms: breed, pedigree, purebred, grade, scrub, and type or conformation.
	Invite a breed association representative, a classifier, or an animal breeder to discuss the importance of breed classification, pedigrees, and type of conformation, and explain how these factors influence the performance and value of animals.	Summarize the main points made by resource person, and file in notebook.	Explain the purposes of classifying, showing, and judging animals.

Selection of Animals (4) (cont'd)			Write and give a 2-3 minute talk on, "Why I selected (specific breed) for my supervised work experience livestock project."
	Arrange for students to select and raise animals at home, at school, or as part of a supervised work experience program. Discuss student responsibilities for feeding and caring of animals and the need for keeping records.	Select and carry out an animal project for a supervised work experience activity.	The quality of the animal selected by the student for the work experience project will be evaluated by the instructor. The student's work experience program will be evaluated by instructor.
Animal Reproduction (5) • Anatomy and physiology . Male track . Female track	Define and explain the terms that relate to animal reproduction.	List the terms with their definitions that relate to animal reproduction, and file in notebook.	Define five terms associated with animal reproduction.
	Distribute a worksheet, and have students identify and label parts of an animal cell.	Complete worksheet, and file in notebook.	
	If possible, arrange a visit to an artificial insemination co-op to observe the techniques used to collect, process, and store semen.	Summarize key points discussed on field trip. File information in notebook.	
	Divide the class into two groups and discuss the pros and cons of artificial insemination.		Explain the advantages and disadvantages of artificial insemination.
	Use the chalkboard, transparencies, and/or films to identify the anatomy and physiology of the male and female reproductive track. Also, obtain reproductive tracks from a slaughter house to use for identification purposes.	Label drawings of the male and female reproductive system.	Explain the function of the major parts of the reproductive tract.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Animal Genetics (6)	Define and explain the terms that relate to animal genetics.	List the terms with their definitions that relate to animal genetics, and file in notebook.	Define terms associated with animal genetics.
	Discuss how genetics can be used to influence the production, type or conformation, and performance of livestock.		
	Discuss the improvement of animals by cross breeding, embryo transplant, and artificial insemination.		
Animal Housing (7) ● Laboratory animals . Hamsters . Gerbils . Mice . Rats . Guinea pigs ● Pets . Dogs . Cats . Birds . Tropical fish . Rabbits ● Livestock . Dairy . Beef . Horses . Sheep . Swine . Goats . Poultry	Discuss the need for ventilation, heat, light, water, food, and waste disposal for various kinds of animals. See "Modules of Instruction in Agricultural Production."		Explain the need for adequate ventilation, heat, light, water, and space when raising animals.
	Explain the importance of planning for equipment when providing housing for laboratory animals, pets, and livestock.		
	Develop with students a chart showing the space required for shelter, water, and food for selected kinds of animals.	Make a chart showing space required for shelter, water, and food for small laboratory animals, pets, and selected livestock. File in notebook.	Explain the space requirements for shelter, food, and water for a specific animal.
	Develop with students basic plans for housing of selected kinds of animals.	Plan the housing needs for a specific animal enterprise.	The student's plans for the housing of a specific animal will be evaluated by the instructor.

Animal Housing (7) (cont'd)	Arrange for the class to visit a small animal laboratory, a pet business at a shopping center, dog kennels, game farm, zoo, or a small animal hospital, and have the owner and/or employees discuss the different types of housing and equipment used to care for the animals.	Summarize key points made by resource people. Comment on any maintenance problems that result from the various types of housing for different animals. File in notebook.	
	Invite a building contractor or an agribusiness representative to discuss problems associated with constructing and equipping housing facilities for animals. Discuss basic building and zoning regulations, site selection, cost of building materials, and equipment needed for specific animal enterprises.	Summarize major points made by building contractor or agribusiness representative on building and equipment needed to house small and large animals. File in notebook.	Discuss alternative housing arrangements, and select one that is best suited for a specific situation and a particular animal.
		Prepare a picture display of the housing and equipment needed for a selected animal project. Discuss the reasons for the selections.	
Animal Digestive Systems (8) • Ruminants • Monogastric • Avian	Define digestion, and explain the functions of the various parts of the digestive system.		Explain the functions of the various parts of the digestive system.
	Use transparencies, models, and photographs to show three types of digestive systems. Point out and describe the functions of all the parts of ruminant, monogastric, and avian digestive systems.	Label the parts of the digestive track of ruminant, monogastric, and avian type animals.	Describe what happens to feed when it is eaten by ruminants, monogastric, and avian type animals.
Animal Nutritional Requirements (9) • Water • Protein • Carbohydrates • Vitamins • Minerals • Fats	Discuss the essential nutrients for animal functions, and explain how these nutrients affect growth, maintenance, production of work, and reproduction.	Make a chart showing the effects of the six essential nutrients on animal functions.	Discuss different nutrients and their function in the animal body.
	Explain how nutrient deficiences affect animal health. Use slides or pictures to show animals with nutrient deficiencies.		Give a 2-3 minute talk on the importance of providing the proper nutrients for an animal project.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Animal Nutritional Requirements (9) (cont'd)	Explain the following animal nutrient terms: ration, balanced ration, feed, total digestive nutrients, roughages, and concentrates.		Define four terms associated with feeding animals.
Sources of Nutrients (10)	Lead a class discussion on the sources of essential nutrients.		List two sources for each essential nutrient.
• Roughages	Explain the functions of roughages in animal feeding.		Explain the importance of roughages in animal feeding.
	Ask students to bring to class samples of roughages.	Bring to class samples of roughages such as hay, silage, and haylage.	List five examples of roughages used in animal feeding.
• Concentrates	Explain the functions of concentrates in animal feeding. Display labeled jars of the various ingredients used in formulating animal feeds, and explain the nutritional value of each.	Collect in jars samples of feed ingredients such as soybean oil meal, bran, hominy, middlings, brewers' grain, and beet pulp.	Explain the importance of concentrates in animal feeding.
	Invite a manager of a feed store to explain how formulated feeds are manufactured including the ingredients and additives used.	Record key points made by guest speaker, and file in notebook.	List 10 examples of concentrates used in formulating animal feeds.
	Discuss the protein, fat, and fiber content of feeds using feed tags from formulated livestock, pet, and laboratory feeds.	Visit a feed and/or grocery store to collect information from feed tags for pet, laboratory, and livestock feeds.	Explain the information found on a tag or label of an animal food.
Feeding of Animals (11) • Feeding programs	Develop with students feeding programs for different types of animals.	Compile a list of different kinds of animal feeds that are available at local feed and grocery stores.	Explain how to develop a feeding program for a specific animal.

Feeding of Animals (11) (cont'd) • Feeding systems	Discuss hand, self-feeding, and automatic feeding systems. Explain the need to feed animals according to a set schedule.		Discuss two types of animal feeding systems, and explain the advantages and disadvantages of each. Describe what may happen to animals when they are overfed, underfed, or not fed on schedule.
	Develop with students a chart showing animals, kinds of feeds, feeding programs, and feeding systems for pets, laboratory animals, and livestock.	Complete chart, and file in notebook.	Select and follow an animal feeding program for a supervised work experience project. Explain the reasons for choosing the specific kinds of feeds, feeding program, and schedule.
Maintenance of Animal Health (12) • Diseases, parasites, and physiological . Diagnosis . Control . Treatment . Prevention	Discuss the importance of having a sound health program when working with animals.		Explain the importance of having a preventative health program when working with animals.
	Discuss the symptoms of poor health in animals.	Using references, write a report giving the symptoms, cause, treatment, and prevention of one animal disease or parasite.	
	Develop with the students a chart showing name, symptoms, treatment, control, and prevention of common diseases and parasites associated with livestock, pets, and laboratory animals such as rabies, scours, distemper, worms, and mites.	Compile a list of diseases affecting animals for a specific supervised work experience project.	For five common diseases name the animals affected and give control measures for each disease.
	Discuss how nutrient deficiences can cause physiological health problems.	List health problems caused by nutrient deficiences.	From a collection of pictures of diseased animals, name those that are caused by nutrient deficiences.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Maintenance of Animal Health (12) (cont'd)	Arrange a field trip to a local veterinary hospital, the College of Veterinarian Medicine, or a New York State Agricultural and Technical College to observe health practices and disease research. Prepare and distribute worksheets for the field trip.	Complete the worksheet for the field trip, and file in notebook. Summarize main points observed on the field, and file in notebook.	
	Demonstrate how to perform a post mortem on a chicken to show organs, or collect organs from a slaughter house to show both diseased and normal parts.	Observe post mortem, and note condition of the diseased and normal organs.	Given 10 pictures of diseased animals or organs, name seven diseases, and give the treatment for each.
Approved Safety Practices (13)	Discuss the importance of following safe procedures when caring for and handling animals.	List 10 safe procedures that should be followed when working with animals.	Explain the importance of using safe procedures when working with animals.
	Demonstrate techniques used to hold and restrain animals when carrying out such approved practices as: vaccinating, giving medication, docking, castrating, shearing and clipping, dehorning, debeaking, and providing foot care.	Using animals owned by the school or student, perform such approved practices as needed to develop the necessary competencies for a specific supervised work experience project.	List eight approved practices that affect animal health and appearance. Discuss the purpose of each approved practice. The student's performance of approved practices relative to further supervised work experience project will be evaluated by the instructor.
	Arrange a field trip to a small animal hospital or a farm having a veterinarian working on animals to show students techniques and methods used in carrying out specific approved practices.	Summarize the main points observed on the field trip, and file in notebook.	

Management Practices (14) • Housing • Sanitation • Breeding • Feeding • Recordkeeping	Discuss the need for using sound management practices when raising animals such as providing the required space, ventilation, food, water, heat, and sanitation. See "Modules of Instruction in Agricultural Production."	List the management practices that should be followed when raising animals.	Explain the importance of using sound animal management practices when raising animals.
	Explain how to recognize when animals are in heat. Also, state the best period and appropriate methods to use when breeding animals.	List the characteristics of animals when they are in heat.	
	Discuss how to handle and care for newborn animals.		
	Discuss the breeding, feeding, health, and mortality information that is essential to record for an animal project.	Using appropriate data supplied by the instructor, complete sample health, breeding, feeding, and mortality records.	List four types of information recorded for animal projects, and explain the need of each record.
		Keep appropriate records for supervised work experience project.	The records kept by the student for his/her supervised work experience project will be evaluated by the instructor.
	Discuss FFA Accomplishment, Achievement and Individual awards in animal science. Provide a supervised study period to examine and study the pamphlet, "New York State Records for Occupational Experience in Agricultural Education," to become acquainted with the records required for supervised work experience programs and FFA award applications.	Apply for FFA animal science awards that relate to the individual's supervised work experience program. Complete appropriate applications for selected awards.	The student's application for FFA awards will be evaluated by the instructor before being submitted for competition.

PLANT SCIENCE

Unit 14

Class Sessions - Course 1 — 20 Course 2 — 20

Objectives

After completing this area of instruction, students will be able to:

(1) Describe 10 job opportunities requiring a knowledge of plant science.

(2) Explain four ways in which plants affect our daily living.

(3) Name by sight five plants for each of the following: forest, fruit, vegetable, and field and forage crops.

(4) Describe the functions of four parts of a seed.

(5) Describe the functions of four parts of a plant.

(6) Explain how the scientific names of plants can be helpful to the consumer.

(7) Explain the difference between sexual and asexual plant reproduction.

(8) Perform asexual plant propogation for specific crops.

(9) Develop a plan for a specific crop project.

(10) Select seeds for specific crops.

(11) Explain the factors that affect seed germination.

(12) Conduct a seed generation test.

(13) Prepare a seedbed and plant seeds for specific crops.

(14) Transplant and thin a specific crop.

(15) Prune and shear trees and shrubs.

(16) Describe the environment required for the growth of horticulture, forest, vegetable, and field and forage crops.

(17) Determine fertilizer requirements for specific crops.

(18) Fertilize a specific crop.

(19) Plan a pest control program for specific crops.

(20) Explain when and how crops should be harvested.

(21) Harvest a specific crop.

(22) Explain how the storing and handling of crops can affect their quality and value.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in Plant Science and Related Fields (1) ● Production ● Technical ● Sales and service ● Related occupations	Develop with the class a list of job opportunities that requires a knowledge of plant science. See list of occupations in the curriculum guide, "Horticulture," published by Iowa State University.	Prepare a list of 10 jobs in the community, area, or region that require an understanding of plant science. File information in notebook.	Describe two specific jobs in the field of plant science, and give the qualifications for each.

Occupational Opportunities in Plant Science and Related Fields (1) (cont'd)	Invite or visit a greenhouse or nursery owner, cash crop farmer, or other person engaged in a plant production oriented occupation to discuss career opportunities in his/her area.	Determine the job qualifications of any operator or employee visited on field trips. Record information and file in notebook.	Describe 10 jobs requiring a knowledge of plant science.
	Invite or visit a representative of an agribusiness that sells products or provides services used in plant production to explain the job opportunities that exist in the field of plant science.	Summarize the main points made by people visited on field trips or invited to class to discuss career opportunities in plant science. File information in notebook.	
	Invite or visit a person employed at a technical level job such as an agronomist or Extension Service agent to discuss the qualifications, working conditions, personal requirements, educational requirements, hours and wages, and training opportunities in his/her field.		
Importance of Plants (2)	Discuss ways that crops are used in edible and nonedible products.		Give five examples that show the importance of plants to society.
• Clothing • Shelter • Replenish oxygen • Esthetic value	Divide class into small groups. Arrange for students to visit building supply houses and grocery, feed, clothing, and fabric stores. Have students make lists of products found in each place visited that are made from various plants. Develop a master list of all products identified.	Visit assigned location, and develop a list of products made from plants. Report findings to class.	List eight products that are derived from plants.
	Use county census data to determine the economic value of crops produced in the county.		List the major crops produced in the area.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Importance of Plants (2) (cont'd)	Point out on outline maps of New York State, the United States, and the world the major crop producing areas.	Draw on maps the major crop producing areas in the United States and New York State.	List the major crop producing areas in New York State and the United States.
	Develop with students population charts that show growth trends of people in the United States and the world, and relate this to the problem of producing enough food to feed everyone.	Bring in newspaper and magazine articles related to food problems in the United States and world. Discuss the problems and suggest possible solutions.	
Kinds of Plants (3) ● Horticulture ● Forest ● Fruit ● Vegetable ● Field and forage	Have students bring in specimens of different kinds of plants. Discuss and name each specimen brought in by students.	Bring in specimens of different kinds of plants that are in season.	Arrange a list of 20 plant species or pictures of plants into categories according to kind of plant.
	Arrange for the class to visit a greenhouse, nursery, or a farm where vegetables or field crops are grown that are unique to the area to observe the various kinds of plants that are being grown.	List the various species of plants observed on the field trip, and file in notebook.	
Parts of Seed (4) ● Seed coat ● Plumule ● Radicle ● Cotyledon	Discuss, using a transparency with overlays, the functions of the various parts of a seed. Prepare a worksheet showing parts of a seed, and distribute to students.	Label parts of seed as indicated on worksheet.	Explain the functions of four parts of a seed.
Parts of Plants (5) ● Roots ● Stem ● Leaves ● Flowers	Discuss, using a transparency with overlays, the functions of the various parts of a plant. Prepare a worksheet showing the parts of a plant, and distribute to students.	Label the parts of a plant as indicated on worksheet, and file in notebook.	Explain the functions of four parts of a plant.

Plant Classification (6)	Discuss reasons for classifying plants. Show the order of classification in using a specific plant. Explain how plant classification can be helpful to the consumer.	Using several seed catalogs, list the scientific names for 10 common plants. Indicate when different common names have been assigned to the same plant.	Explain how a person can use the scientific name to insure that he/she is purchasing the correct plant.
Plant Reproduction (7,8) • Sexual	Discuss, using a transparency, the function of each part of a flower. Discuss pollination and fertilization. Distribute a diagram of the parts of a flower.	Label, during discussion, the diagram of the parts of a flower. Record notes on pollination and fertilization, and file in notebook.	Given a diagram of the flower, correctly label each part. Define the terms pollination and fertilization.
	Use a film that shows the development and production of hybred seed varieties.		
• Asexual	Explain, using slides and pictures, the asexual propogation of different kinds of plants. Include such examples as cuttings - stems; layering - strawberries; separation - bulbs; division - potato; grafting - fruit trees. See "Modules of Instruction in Ornamental Horticulture" and materials available from IMS.	Make a list of the major types of asexual plant propogation, and file in notebook.	List two crops associated with each method of asexual plant propogation.
	Arrange for a visit to a nursery or greenhouse to observe asexual propogation techniques.	Summarize the kinds of plants and types of asexual propogation observed on field trip, and file in notebook.	
	Demonstrate the propogation of plants from root, stem, or leaf cuttings. Utilize a terranium, plant grower, or greenhouse for the process.	Prepare propogation media and root designated types of cuttings.	The cuttings rooted by the student will be evaluated by the instructor.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Crop Planning (9)	Discuss with the students the need to develop plans for horticulture, vegetable, and field and forage crop projects.	Assist in growing a crop as a fund raising project for the local FFA chapter.	Evaluate student's participation in the fund raising project.
	Develop with students plans for specific crops. Include crop varieties, quality of seed, planting dates, location within growing area, and rotation of crop.	Develop a plan for a specific crop project.	The student's plan for a specific crop project will be evaluated by the instructor.
Seed Selection (10) • Germination • Days to maturity • Purity • Quality	Use a supervised study period to have students determine the importance of percent of germination, days to maturity, percent of purity, and quality of seed in seed selection. Discuss results.	Determine, using references, the importance of percent of germination, days to maturity, percent of purity and quality of seed in seed selection.	Explain the importance of five factors that influence the selection of seed. Order the correct amount of seed for a specific crop project.
	Discuss, using a transparency, the length of growing seasons and growing degree days in the different regions of New York State.	Using references, calculate the growing season and growing degree days for the local area.	Explain how the number of growing degree days affect the growing season. List the average dates for the last killing frost in spring and the first killing frost in fall for the area.
	Show how to select appropriate varieties and reputable sources for seeds using "Cornell Recommends" and seed catalogs. Demonstrate how to complete a seed order blank.	Select variety, quantity, and source of seed for an individual or class project, and complete a seed order blank.	For specific crops identified by the instructor, select appropriate varieties for the area.

Seed Germination (11,12)	Discuss how heat, moisture, seed viability, and light (in some cases) affect seed germination.		Discuss three factors that affect seed germination.
	Demonstrate how to conduct a germination test using damp towels in a pan. Show how to determine percent of germination for seed samples. Have groups of students make germination tests, and ask each group to vary one factor affecting germination. Summarize the results.	Determine percent of germination for a given seed sample. Conduct germination tests, and vary one factor for each test. Record differences observed, and report findings to class.	Explain how to make a seed germination test.
	Show slides from the "Growth of a Corn Plant" to illustrate germination.		
	Plant corn or beans next to the side of a clear glass jar to show germination.	Observe the germination of the corn or bean seeds.	
	Provide references and have students find the optimum conditions for the germination of flower, vegetable, forest, and field and forage crop seeds.	Find and record the optimum conditions for the germination of specific crops. File information in notebook.	
Seedbed Preparation (13) • Tillage equipment	Discuss the steps required to prepare a seedbed. Include the following tillage tools: plows, disks, drags, harrows, culti-packers, minimum tillage equipment, and rotary tillers.	List the functions of the following tillage tools: plow, disk, drag, harrow, culti-packer, minimum tillage equipment, and rotary tillers. File information in notebook.	Describe the characteristics of a good seedbed. Describe how to prepare a good seedbed.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
• Artificial soil mixes	Develop a worksheet to be used with Cornell bulletin, "Artificial Soil Mixes."	Complete worksheet on artificial soils, and file in notebook.	Explain the purpose of each ingredient in an artificial soil mixture.
	Discuss the uses of artificial soils, and demonstrate how to mix the ingredients.	Mix artificial soils for a specific horticultural project.	Give three advantages of using artificial soils for growing plants.
Planting of Seeds (13)	Discuss with students the various methods and equipment used for planting seeds of different crops.		Explain how to plant seeds for a specific crop.
	Obtain different types of planters that are used locally, and demonstrate how to calibrate and adjust them for planting various crops.	Calibrate and adjust a planter for a specific crop. Conduct a plant population study using a specific crop. Summarize results, and share findings with class.	Explain how to calibrate and adjust a planter for a specific crop.
	Discuss the amount and placement of fertilizer at planting time. Demonstrate how to adjust and calibrate for fertilizing.	Calibrate and adjust a planter for fertilizing. Conduct tests using different amounts, kinds, and placements of fertilizers for a specific crop. Summarize results, and share findings with class.	Explain the importance of the placement of the fertilizer and seed for a specific crop.
	Demonstrate how to sow flower and/or vegetable seeds in a market pack or flat. Discuss planting depths.	Sow vegetables and/or flower seeds in a market pack or flat, and grow in greenhouse or plant grower.	Market packs and/or flats planted by the student will be evaluated by the instructor.

Transplanting of Stock (14)	Arrange a field trip to a nursery, commercial greenhouse, or truck farm to observe various methods of transplanting stock. Have operator discuss time to transplant, equipment used, spacing, age, size of plants, and protection of plants.	Summarize main points made by operator on transplanting, and file in notebook.	Explain the method used to transplant a specific crop.
		Transplant seedlings for a specific crop.	Seedlings planted by the student will be evaluated by the instructor.
		Plant ornamental shrubs and/or flowers on the school grounds as a class project.	Shrubs and/or flowers planted by the student will be evaluated by the instructor.
	Demonstrate how to plant tree seedlings as part of a reforestation project.	When applicable, order and plant seedlings to reforest a specific land area.	The forest seedlings planted by the student will be evaluated by the instuctor.
Thinning of Stock (14)	Lead a class discussion on the purpose of thinning greenhouse, garden, and forest crops.	Plant seeds in a flat or market pack using different seeding rates and row spacings. Observe results, and record information in notebook.	Explain how thinning affects plant growth and yield.
		Practice thinning of bedding plants as part of a greenhouse project.	Student's thinning of bedding plants will be evaluated by the instructor.
	Arrange a field trip to a forest plantation where timber stand improvement has been practiced, and to a forest plantation in need of thinning to show the effects on the trees of the competition for food and space.	Follow recommended practices when thinning forest plantations on private and/or public lands.	Student's thinning of a forest plantation will be evaluated by the instructor.
Pruning and Shearing of Trees and Shrubs (15) • Decidous • Evergreen	Use before and after pictures to show how pruning and shearing of trees and shrubs improve their quality and esthetic appearance.	List two major reasons for pruning and shearing trees and shrubs.	Explain how the quality and appearance of trees and shrubs are improved by pruning.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Pruning and Shearing of Trees and Shrubs (15) (cont'd)		Assist in growing Christmas trees as a local chapter fund raising project.	
		Serve on a team that provides pruning and shearing services to a local tree farm.	Students pruning and shearing services will be evaluated by the instructor.
	Arrange a field trip to a nursery, tree farm, or landscaping business to have the owner demonstrate methods and equipment used to prune and shear trees and shrubs.	Under supervision, prune and shear trees and shrubs on school property, public or private lands, at the land laboratory facilities, or at home.	The student's work of pruning and shearing of trees and shrubs will be evaluated by the instructor.
	Discuss the importance of safety when pruning and shearing trees and shrubs. Demonstrate how to use hand and power pruning equipment.	Dress properly, select the needed equipment, and check to see that it is in safe working condition, and use safe procedures when pruning and shearing trees and shrubs.	Explain the importance of personal safety when pruning and shearing trees and shrubs.
Growth of Plants (16) • Environmental factors	Discuss with the students the requirements for plant growth. Include such topics as soil, air, water, light, nutrients, and temperature. Discuss how deficiencies of each factor affects plant growth, and give the necessary corrective procedures to follow. See materials available from IMS.	List the factors necessary for plant growth.	Describe the symptoms in plant growth that indicate various environmental deficiencies, and make recommendations to correct specific problems.
	Have students conduct experiments to show the effects on plant growth of controlling such factors as moisture, light, nutrients, and temperature.	Conduct experiments on plant growth by controlling in each test one of the following: temperature, moisture, light, and nutrients. Record observations, and file information in notebook.	Use the test results to explain the effects of temperature, moisture, light, and nutrients on plant growth.

• Terms	Use transparencies to explain the following terms: photosynthesis, chlorophyll, transpiration, respiration, and translocation.	Diagram the following: The respiration cycle, the transpiration cycle, and the photosynthesis formula.	Explain the following terms: photosynthesis, respiration, and transpiration.
	Have students conduct experiments on respiration using plastic covers and controlled air movement.	Conduct experiments on respiration. Record observations, and share findings with class. File information in notebook.	
	Have students conduct experiments on transpiration using food coloring in water.	Conduct experiments on transpiration. Record observations, and share findings with class. File information in notebook.	
	Have students conduct experiments to show the effect of light on the formation of chlorophyll.	Conduct experiments with geranium plants to show the importance of light on chlorophyll formation. Record observations, and share findings with class. File information in notebook.	
Fertilization of Plants (17,18) • Major elements	Discuss the importance of the three major elements needed for plant growth. See materials available from IMS.	List three major elements needed for plant growth.	Explain the functions of each major element to plant growth.
	Demonstrate how to take soil samples, and test for nitrogen, phosphorus, and potash.	Bring to class samples of soil for testing. Test soil samples for nitrogen, phosphorus, and potash, and record results.	Test a given soil sample, and identify nutrient deficiencies. Make recommendations for fertilizing a specific crop.
	Explain how to interpret the results of testing the soil and how to calculate the amounts of each nutrient needed for specific crops.		Explain the advantages of testing the soil for nutrient deficiencies.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Fertilization of Plants (17,18) (cont'd)	Discuss how to interpret the analyses found on containers of fertilizer.	Bring in containers of fertilizers, and indicate the analysis for each fertilizer.	Explain the analysis of a fertilizer as stated on the container.
	Discuss the application of a fertilizer for vegetable and field and forage crops. Consider such items as equipment used, methods of application, types of fertilizers (organic and inorganic) time of application, and placement.	Determine the fertilizer requirements for a specific class project, and apply the needed kinds and amounts.	Test a given soil sample, and indicate the kind of fertilizer needed and the time and method of appliation for a specific crop.
	Arrange a field trip to a greenhouse to observe how and when fertilizers are applied to specific crops. Have the operator discuss the necessity of having a schedule for applying fertilizers.	Summarize observations made on field trip, and file information in notebook.	
• Lime requirements	Demonstrate how to test soil samples for pH. Explain how to interpret and use the information from the test to determine lime requirements for specific crops.	Determine the lime requirement for a specific class project, and apply the needed lime.	Test a given soil sample for pH, and make liming recommendations for a specific crop.
• Minor elements	Discuss, using color pictures, the effects on plant growth of deficiencies in the minor elements.		
Control of Plant Pests (19) • Types . Weeds . Insects . Disease	Use slides, specimens, and/or pictures to show the different pests of plants such as weeds, insects, and diseases that are common to the crops grown in the area or region. See materials available from IMS.	Study pictures or specimens of insects, diseases, and weeds common to the crops grown in the area or region.	From a collection of specimens or pictures of insects, diseases, and weeds, name 25 that are common to the crops in the area or region.

Control of Plant Pests (19) (cont'd) • Methods	Discuss the advantages and disadvantages of using chemical, biological, and mechanical methods of controlling crop pests. Explain how each method effects the plants and the environment.	List the advantages and disadvantages of using chemical, biological, and mechanical methods of pest control for crops.	Give two examples for controlling each of the following crop pests: weeds, insects, and diseases. Explain the advantages of each method used.
• Timing	Discuss how the effectiveness of the control of weeds, insects, and diseases is influenced by the methods selected and the times they are used.		
	Explain the methods and equipment used to control pests related to vegetables, horticulture, fruits, and field and forage crops.	Develop a pest control program for the home or a specific situation.	From descriptions of five crops that are being affected by pests, select a control method that would best correct the problem in each situation. Give reasons for each method selected.
	Have students survey farmers in the area to determine the methods used to control weeds, insects, and diseases of crops. From the survey, compile a list of pest control methods used in the area.	Survey farmers in the area to find out the different methods used for the control of weeds, insects, and diseases. Share findings with class.	
	Invite an Extension Service Agent to discuss specific crop pest problems for crops grown in the area.	Summarize key points made by guest speaker, and file in notebook.	
• Pesticides	Develop with students a list of New York State pesticide regulations. Discuss pesticide certification requirements, who must be certified, and how the certification program is administered.	List the regulations that relate to the use of pesticides in New York State.	Explain the importance of pesticide certification, and why pesticide regulations were developed by the Federal Government and are administered by the New York State Environmental Conservation Department.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
• Pesticides (cont'd)	Discuss the safety procedures to follow when using and/or storing pesticides. Explain how the equipment used to apply the pesticides should be cleaned and stored.	List the safety procedures to follow when using and storing pesticides.	
	Discuss names and uses of different kinds of pesticides used in pest control programs.	List pesticides that are used in pest control programs.	Select and use pesticides to control the pests of a work experience crop project.
	Use certified people to demonstrate how to handle and mix pesticides for a hand sprayer. Explain the importance of reading and following the manufacturer's directions when mixing and using pesticides.	List the pesticides used at home, and indicate how they are stored and the disposal methods used for excess materials.	
	Demonstrate how to use the manufacturer's recommendations to calculate the amount of spray needed for specific situations.	Using the manufacturer's recommendations, calculate the amount of pesticide needed to treat crops for specific pests.	
	Demonstrate how to apply pesticides using a hand sprayer.	Using unrestricted pesticides, spray a class project or student crop project. Clean the equipment and dispose of the pesticide container.	
	Discuss names and uses of herbicides used for weed control.	List herbicides used to control weeds.	Explain how to control weeds for specific crops.
	Discuss names and uses of different kinds of fungicides used to control plant diseases.	List fungicides used to control plant diseases.	Explain how to control given diseases for specific crops.
	Discuss names and uses of insecticides used to control insect pests of plants.	List insecticides used to control insect pests of plants.	Explain how to control given insects for specific crops.

Harvesting of Crops (20,21) • Determining maturity . Physical characteristics . Markets	Discuss how maturity influences the physical characteristics of crops.		Explain the relationship of crop maturity to quality, value, and consumer needs.
	Demonstrate how to use a tenderometer to determine the maturity of fruits and vegetables.	Determine tenderometer readings of fruits, and vegetables provided by the instructor. Report readings to the class.	
	Discuss how maturity influences the quality, price, and shelf life of fruits and vegetables.		Explain how growers can control plant maturity in order to receive a better market price for their crops.
	Obtain samples of crops at different stages of maturity. Point out the changes in physical appearance and quality caused by harvesting crops at various stages of maturity.		Describe the characteristics of high quality vegetables, field and forage, and horticulture crops.
	Explain the difficulties in marketing crops that are immature or overripe.		Explain how maturity affects the quality, feed, and market value of crops.
	Demonstrate how to use a crop drier to determine the moisture content of field and forage crops.	Using a crop dryer, determine the moisture content of samples of corn (kernals) corn silage, legume, and mixed hay. Check samples for desirable characteristics such as color, texture, and odor. Rank the samples according to quality, and discuss the reasons for the rankings.	
• Growth regulators	Develop a worksheet for an article describing the uses of hormone growth regulators and chemicals to control the maturity, development, and harvest time of fruit, vegetables, or greenhouse crops.	Complete worksheet on plant growth regulators and hormones, and file in notebook.	Give two situations where growers could benefit by using hormones and growth regulators when producing crops for market.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
• Growth regulators (cont'd)	Visit a greenhouse, fruit, or vegetable farmer that uses hormones to control plant development and crop maturity. Discuss the advantages for using plant regulators.	Record key points observed on field trip, and file in notebook.	
• Methods and equipment . Hand . Mechanical	Arrange field trips to places using different methods of harvesting crops. Compare initial investments, operating cost, and time required to harvest and handle a given acreage or crop, and the advantages and disadvantages of each method of harvesting.	From information gathered on field trips, develop a chart showing advantages and disadvantages of hand and mechanical harvesting methods. File chart in notebook.	Using hypothetical situations for vegetable, fruit, greenhouse, and field and forage crops, determine the best method to use to harvest each type of crop and justify the answer.
	Develop with students a list of mechanical harvesting equipment and their prices. Include machines used for harvesting fruits, vegetables, field and forage crops, trees, and turf.	Make a list of mechanical harvesting equipment used for harvesting fruits, vegetables, field and forage crops, nursery plants and trees, and turf. Use references for equipment prices. File information in notebook.	Explain why capital invested in mechanical harvesting equipment is a good investment.
	Discuss why capital and equipment is replacing hand labor in harvesting agricultural crops.		
• Safety procedures	Discuss with students all safety procedures that must be followed when working with crop harvesting equipment. Emphasize the importance of safety and the supervision required for all minors involved in supervised work experience programs. Explain current federal and State laws governing employment of minors.	Help develop an FFA safety program by providing input to implement the safety provisions of the program of work as it relates to servicing, maintaining, and operating harvesting equipment.	
		Apply for local, district, State and national individual and chapter safety awards.	Student's award applications will be evaluated by the instructor.

Handling and Storing of Crops (22) • Facilities • Equipment • Maintaining quality	Discuss how the methods used to handle and store fruits, vegetables, and flowers affect the quality and price of the produce.	List methods used to handle and store fruits, vegetables, and flowers.	Explain how storage and handling methods can affect the producer, distributor, and consumer.
	Arrange for student visits to cold storage facilities, chain stores, fruit and vegetable packing houses, and florists to observe the handling and storing methods used to maintain and enhance the quality of fruits, vegetables, and flowers. Have owners of storage and packing facilities discuss how they overcome product deterioration.	Summarize key points observed on field trips, and file in notebook.	
	Arrange for students to visit and interview produce managers of stores and supermarkets to discuss the methods they use to handle, store, and market produce.	Interview produce managers to find out methods used to handle and store produce. Summarize findings and share with class.	

AGRICULTURAL ECONOMICS

Unit 15

Class Sessions - Course 1 -- 5 Course 2 — 5

Objectives

After completing this area of instruction, students will be able to:

(1) Describe four job opportunities in agricultural economics.

(2) Describe the organizational structure and operation of four types of agricultural businesses.

(3) State the advantages and disadvantages of each type of business organization.

(4) Explain the principles of marketing agricultural products.

(5) Explain two techniques used to sell agricultural products.

(6) List four different channels used to market agricultural products.

(7) Describe local, State and federal regulations that affect the marketing of agricultural products.

(8) Develop sales ability through experience in selling.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Occupational Opportunities in the Field of Agricultural Economics (1) • Agribusiness • Education • Private sector • Government . State . Federal	Invite a representative from Extension Service to discuss job opportunities in the field of agricultural economics.	Prepare a list of ten specific jobs in the community, area, or region that relate to agricultural economics.	Describe four specific jobs or career opportunities in the community, area, or region that relate to the field of agricultural economics.
	Explain the role of economics in the different specialty fields of agriculture.		Give three examples that show the importance of economics to different specialty fields of agriculture.
	Arrange for the class to visit a florist, animal breeder, production farmer, and/or farm machinery dealer to discuss the economics of their specialty businesses.	Summarize the main points made by owners of the various businesses visited on field trips, and file in notebook.	

Occupational Opportunities in the Field of Agricultural Economics (1) (cont'd)	Invite a local banker or representative from Production Credit, Federal Land Bank, or Federal Housing Administration to discuss the importance of agricultural economics from their point of view.	List the key points made by guest speakers from the banking industry, and file in notebook.	
Organizational Structure and Operation of Agricultural Businesses (2) ● Types . Individual ownerships . Partnerships . Cooperatives . Corporations ● Local examples	Discuss briefly the four types of agricultural businesses: individual ownerships, partnerships, cooperatives, and corporations.		Explain the organizational structure of two different types of agricultural businesses.
	Develop with students a list of examples of agricultural businesses in the community, region, or State that are operating as: ● Individual ownerships ● Partnerships ● Cooperatives ● Corporations	Survey the types of agricultural businesses in the community, area, and region, and classify each business according to its specific type.	From a list of eight different types of agricultural businesses, classify each business according to its type.
	Invite representatives from different types of agricultural businesses to discuss their organizational structure.	Summarize the key points made by the speakers, and file in notebook.	Write a report on the organizational structure of two different types of agricultural businesses described by the guest speakers.
	Arrange for students to visit each type of agricultural business in the area during business hours to observe business operations and talk with management personnel. Prior to each visit, discuss with students the specific type of business being visited and the purpose of the trip.	Visit different types of businesses in the area during business hours, and observe business operations and talk with management personnel about operational procedures. Record key points observed at each location, and file in notebook.	Write a report on the operational procedures of two different types of agricultural businesses visited.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Advantages and disadvantages of different types of business organizations (3)	Lead a class discussion on the advantages and disadvantages of each type of agricultural business.		List four types of agricultural businesses and give two advantages and two disadvantages of each.
Principles of Marketing Agricultural Products (4) • Supply and demand	Discuss the economic principles of supply and demand as they apply to the marketing of agricultural products. Use as examples the changes in prices of agricultural products based on supply and demand.	Select several agricultural products, and keep a record of their weekly prices over a period of time. Explain the reasons for the changes in the prices for each product.	For a specific agricultural product, explain why there are fluctuations in the price.
	Invite a person involved in agricultural economics to discuss the principle of supply and demand as it applies to agricultural products.	Summarize the key points made by the speaker, and file in notebook.	Explain how the principles of marketing apply to agricultural products.
	Arrange for the class to visit a storage facility for agricultural products. Have a member of management discuss the advantages and disadvantages of holding products and marketing them at a later time.	Summarize the key points made by the speaker. Note and record the important things observed at the storage facility. File information in notebook.	Explain how points on marketing that were discussed by the speaker could be applied to a product of a supervised work experience program.
Techniques of Selling (5)	Invite a distribution business education teacher to discuss the techniques of selling.	Summarize the key points made by the teacher on selling, and file in notebook.	Show how to apply the techniques of selling to the marketing of an agricultural product.
	Develop a list of potential products that could be sold by the local FFA chapter. Consider such items as Christmas trees, seeds, flowers, produce, fruits, fertilizer, and fence posts.		
	Develop with the class a list of products that are sold locally along with prices charged.		

Techniques of Selling (5) (cont'd)	Explain the importance of avoiding products that would compete with local businesses.	Participate in the various money raising activities conducted by the FFA.	
	Discuss the need to obtain permission to sell products from school authorities.	Obtain permission from the school administrators to sell the products.	
	Select an appropriate product that could be sold by the FFA chapter.		
	Discuss the need of keeping an accurate record of all items bought and sold.		
	Set up a recordkeeping system that will be used, and appoint a person to be responsible for maintaining the records of the fund raising activity.		Keep accurate records of items bought and sold. The records for the various activities will be reviewed by the instructor.
• Advertising	Discuss the role advertising plays in the marketing of agricultural products.	Develop examples of advertisements for agricultural products for each of the following media: Newspaper Magazine Radio Television	List five ways to advertise the products sold by the local FFA chapter.
• Auctions	Explain the advantages and disadvantages of auctions.		
	Arrange a field trip to an agricultural auction, or conduct a mock auction in class to illustrate sales procedures.	At the auction, follow the procedures, and record the prices paid for specific items.	Explain the variation in prices received for different products.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Marketing Channels (6) • Direct • Jobber • Wholesaler • Retailer	Discuss the various channels that are used to market agricultural products.	List the methods used locally to market agricultural products.	Explain four channels used to market agricultural products.
	Establish a hypothetical situation for marketing an agricultural product, and have students suggest the various channels that may be used to market the product. Divide students into small groups, and assign each group a product to market. Give each group necessary market information such as prices and cost to produce.	Select a market channel to use, and show potential profit from that channel for an assigned product. Explain why the channel was selected and how it would operate.	
Marketing Regulations (7) • Federal • State • Local	Invite local producers to explain how federal, State, and local marketing laws and regulations affect their business.	Summarize key points made by speakers, and file in notebook.	Explain how the different government regulations affect the marketing of agricultural products.
	Invite government officials to explain how federal, State, and local marketing laws and regulations are designed and enforced.	Summarize key points made by speakers, and file in notebook.	
	Discuss the speakers' opinions of the various regulations.		
Salesmanship (8) • Opportunities in agricultural sales • Personal qualities needed • Opening the sale • Handling customers objections to purchase • Closing the sale	Invite a salesperson who sells agricultural products to discuss the job opportunities in the field of sales.	Summarize the key points made by the speaker, and file in notebook.	List as many sales jobs as possible that were mentioned by the speaker.
	Arrange to have a personnel manager discuss the type of individual he/she seeks for sales positions.	Summarize key points made by speaker, and file in notebook.	List the qualities necessary to be successful in the field of sales.
	Discuss three steps in selling a product. Use role playing to simulate the selling process but keep the role playing restrictive and under control at all times.	Participate in role playing situations relating to selling products.	Explain the three steps in selling a product. The student's effectiveness in selling FFA products will be evaluated by the instructor.

ENERGY CONSERVATION

Unit 16

Class Sessions - Course 1 — 3 Course 2 — 3

Objectives

After completing this area of instruction, students will be able to:

(1) List the forms in which energy is consumed.

(2) List the agricultural operations that use energy.

(3) Define the units of measure for various forms of energy.

(4) Give the heat value for each form of energy.

(5) Calculate the payback of energy conservation modifications, and evaluate the effectiveness of potential conservation measures.

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Forms of Energy (1)	Develop with students a list of all available forms of energy.	Compile a list of all available forms of energy, and file in notebook.	List the major forms of energy.
Agricultural Uses of Energy (2)	Develop with students a list of all agricultural operations that use energy, and indicate the form of energy each uses.	List the agricultural operations that use energy, and indicate the form of energy each uses. File information in notebook.	
	Discuss and rank the agricultural operations based on the estimated cost of the energy used.	Rank the agricultural operations that use energy based on the estimated cost of the energy used. File information in notebook.	List five agricultural operations which have high energy needs.
	Discuss the indirect uses of energy in agriculture such as the production of fertilizer, pesticides, and machinery.	List the indirect uses of energy in agriculture, and file in notebook.	
	Discuss the energy requirements for growing various plants and livestock used for human consumption. Develop information that shows the relative efficiency in the use of energy (cal.output/cal.input) of the various commodities.	Rank the various plant and livestock food products used for human consumption based on the relative efficiency in the use of energy during the production processes. File information in notebook.	

CONTENT OUTLINE	INSTRUCTIONAL SUGGESTIONS	STUDENT ACTIVITIES	EVALUATIVE SUGGESTIONS
Units of Measure (3)	Discuss the meanings of the various units of measure (gal, ft^3, kwh) for different forms of energy.	List the various units of measure for different forms of energy, and file in notebook.	Define the units of measure for different forms of energy.
	Discuss additional energy terms such as (calorie, therm, British thermal unit.)		
• Heat Value (4)	Develop with students a chart showing the heat values (Btu's) of each form of energy.	Make a chart showing the heat value of each form of energy.	
Evaluation of Energy Conservation Activities (5)	Discuss with students the importance of concentrating the energy conservation measures in operations that use the most energy.	Interview an owner of an agricultural business to determine the various energy expenses, and rank them in order of cost.	
	Discuss various agricultural enterprises and the largest energy consuming operations in each. Assign groups of two or three students to research energy consumption in specific operations.	Complete research project, and report findings to class.	Reports on energy consumption in specific agricultural operations will be evaluated by the instructor.
	Indepth discussion of various conservation practices are to be included as part of specific units of instruction such as tractor selection (diesel vs. gasoline fuel), greenhouse management (reduction of heat loss), and milk cooling (use of heat exchangers).		Given a selected number of agricultural enterprises, rank the major operations in each in terms of energy consumption.

• Payback of energy conservation	Discuss the payback period for an energy conservation investment.		
	Work a problem to show how to calculate the payback of energy conservation.		
	Develop several problems involving energy payback for several different types of agricultural enterprises.	Solve problems involving energy payback, and file in notebook.	Given a specific problem, calculate the energy payback.